OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

AMERICAN

DYESTUFF REPORTER

DEVOTED TO TEXTILE CHEMISTRY • BLEACHING • DYEING • PRINTING • FINISHING

MARCH 5, 1951
VOLUME 40, No. 5

3-14

GREENVILLE PUBLIC LIBRARY

THE WOOL DYER
Now Builds Sales Two Ways!

The dyer teams his skills with the weaver's art to create fabrics in beautiful colors pitched to the right key . . . bright or dark, handsome, striking, charming, gay . . . suited to the need, the season, the consumer's taste for fashion. Color always sold the goods!

But today the dyer is helping to build sales appeal in another way, too. In addition to beauty, he "dyes" *safety* into the cloth as well — *durable safety against moth damage!*

Today the dyer protects the cloth as he dyes it, by the application of MITIN* Mothproofer, a development by Geigy that gives a new lift to the sale of woolens. MITIN Mothproofing is durable . . . resistant to wet processing, laundering, dry cleaning, light, perspiration, salt water, weather and wear. It is easily applied, economical, non-toxic to the wearer and safe for the fabric. The original color, hand and texture of the wool remain unchanged.

Market tests show the consumer is anxious for this protection and is willing to pay for it. Retailers and tailors are well aware of the sales promotion value of the *MITIN Mothproofed* tag on garments of wool, worsted and wool blends. The demand for MITIN Mothproofed fabric will grow steadily.

If you haven't used MITIN before, contact Geigy for its full technical background. You will be pleased with the simplicity and ease of application procedures.

*U. S. Pat. No. 2,311,0[illegible]

Geigy

Dyestuff Makers Since 1859

GEIGY COMPANY, Inc.

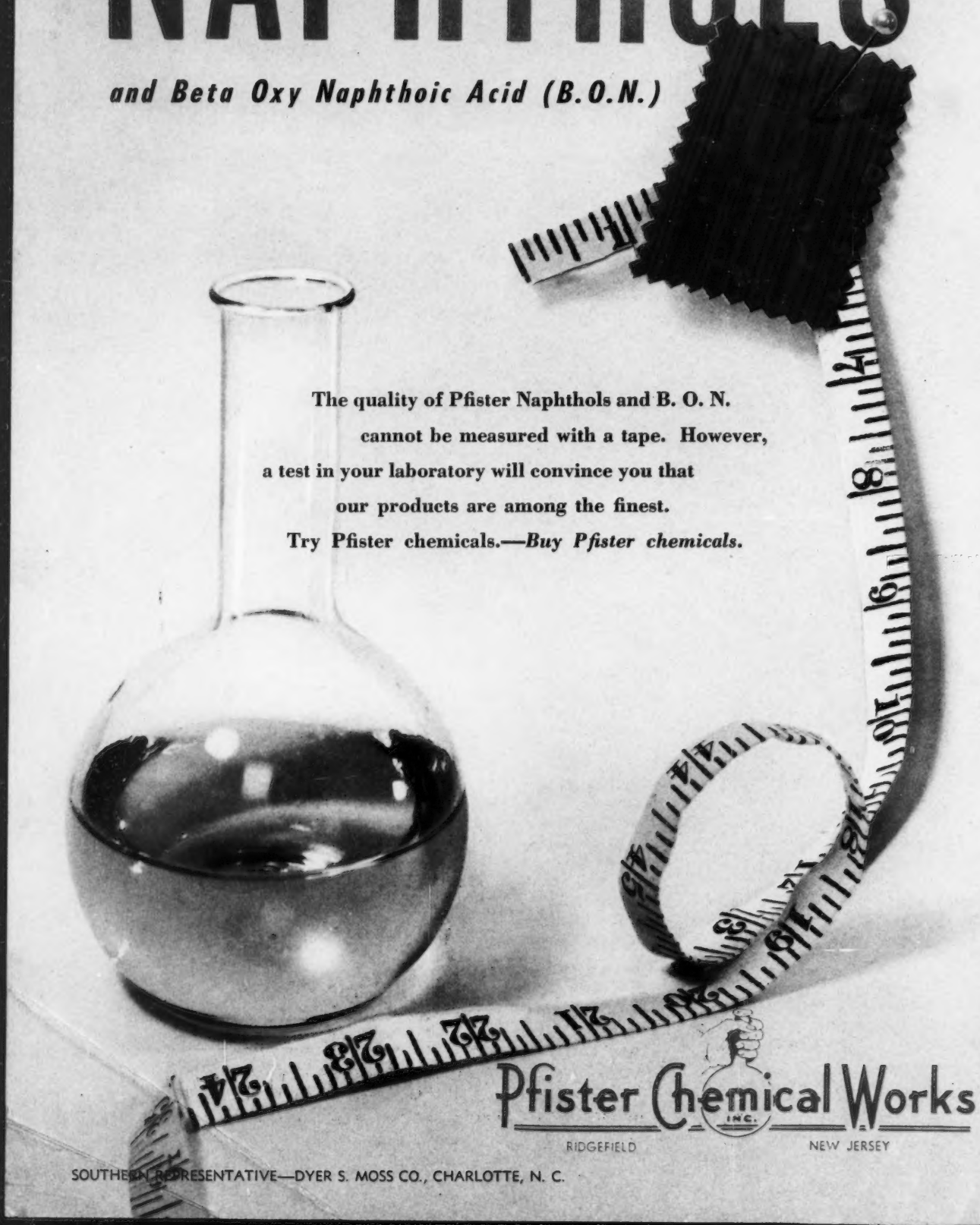
89-91 BARCLAY STREET, NEW YORK 8, NEW YORK

BRANCH OFFICES: Boston • Charlotte, N. C. • Chicago • Los Angeles • Philadelphia
Portland, Ore. • Providence • Toronto

IN GREAT BRITAIN: The Geigy Co., Ltd., National Buildings, Parsonage, Manchester

NAPHTHOLS

and Beta Oxy Naphthoic Acid (B.O.N.)



The quality of Pfister Naphthols and B. O. N. cannot be measured with a tape. However, a test in your laboratory will convince you that our products are among the finest. Try Pfister chemicals.—*Buy Pfister chemicals.*

Pfister Chemical Works INC.

RIDGEFIELD NEW JERSEY

SOUTHERN REPRESENTATIVE—DYER S. MOSS CO., CHARLOTTE, N. C.

FROM CIBA RESEARCH...

NEW!

NEOLAN BLUE 3R

A BRIGHTER CLEARER BLUE that brings within the Neolan range many blue shades hitherto requiring acid-shading colors

NEOLAN BLUE 3R not only extends the brightness range but delivers as well all the time-tested advantages characteristic of Neolan Dyestuffs to the dyeing of wool fabrics.

NEOLAN BLUE 3R is extremely level dyeing, and provides exceptional fastness to carbonizing, perspiration and washing.

NEOLAN BLUE 3R is dischargeable to an excellent white . . . of especial interest for ground shades of printed fabrics.

Samples, and complete data for procedures, are now ready.

CIBA

CIBA COMPANY INC.

627 GREENWICH STREET, NEW YORK 14, N. Y.

Boston Chicago Charlotte
Providence San Francisco Philadelphia

AFTER *30* YEARS OF PIONEERING

We're Still Finding Better Ways to · · ·

IMPROVE DYEING QUALITY

SAVE DYE ROOM LABOR

CUT DYEING COSTS

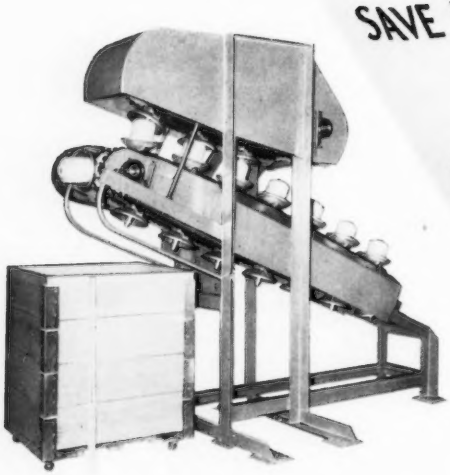
ELIMINATE GUESSWORK

INCREASE CONVENIENCE

INCREASE PRODUCTION

GIVE POSITIVE CONTROL

SAVE TIME



Thanks to the Textile Industry . . . it was through helping to solve your individual problems that we have been able to pioneer outstanding dyeing improvements for the past 30 years.

From the study, service, and planning that goes with every installation of Gaston County Dyeing equipment will come the new ideas which insure *even better* dyeing methods in the future.

GASTON COUNTY DYEING MACHINE CO.

Pioneers in Automatically Controlled Dyeing Machines

STANLEY, N. C.

Albert R. Breen
80 East Jackson Blvd.
Chicago, Ill.

Gaston County Dyeing Machine Co.
Terminal Building, 68 Hudson St.
Hoboken, N. J., G. Lindner, Mgr.

The Rudel Machine Co., Ltd.
614 St. James St., W., Montreal
137 Wellington St., W., Toronto

American Dyestuff Reporter, Vol. 40, No. 5, March 5, 1951. Published every other Monday. Copyright 1951, by Howes Publishing Co., Inc., 44 E. 23rd St., New York 10, N. Y. Domestic subscriptions, $5.00; Canadian, $6.00; Foreign, $10.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y. Post Office, under the act of March 3, 1879.

Acetate colors
for every need

A.A.P. was the first successful U. S. producer of dyes designed specifically for acetate fibres, and its constant stress on quality has made and kept AMACELS the top-ranking favorites in this field. ***New, improved*** AMACELS provide a popular range of colors for dyeing acetate fibres of every type. Listed below are a few of the reasons so many leading acetate dyers rate these colors ***tops*** for quality and reliability.

Amacels*
for . . .

EXCELLENT FASTNESS to light, gas fading, sublimation, decatizing.

"PLUS" ADVANTAGES of simplified application—consistent shade purity—good "pile on"—level dyeing.

ADAPTABILITY—for *dyeing*—box or jig—Acetate yarn—Nylon hosiery; also suitable for *printing*, screen or machine.

For full information on AMACELS, along with data pertinent to your individual problems, consult our nearest branch. Our technicians will be happy to arrange a trial run in your plant.

50 Union Square, New York, N. Y.
Plant: Lock Haven, Pa.
Branches: Boston, Mass • Providence, R. I.
Philadelphia, Pa. • Charlotte, N. C.
Chicago, Ill. • Los Angeles, Cal.
Chattanooga, Tenn.
Dominion Anilines & Chemicals, Ltd.
Toronto, Canada • Montreal, Canada

*Reg. U. S. Pat. Off.

AMERICAN ANILINE PRODUCTS, INC.

HOW TO ASSURE "Happy Endings" FOR WOOL FABRICS

A lot of things can happen to woolen fibers while they're being transformed into yarns and finished fabrics. This is particularly true in the carding and spinning operations. Lubricate your fibers with the proper oil, and you're well on your way to good, saleable fabrics.

And one of the surest ways to head toward a "happy ending" for your finished fabrics is to give your woolen fibers the protection of Proxol.

CHECK THESE PROXOL ADVANTAGES!

In *Carding*

Stable Emulsions • Excellent Fiber Lubrication • Minimum Waste • Less Static • Less Fiber Breakage • No Gumming of Cards • No Corrosion • Better Condensing • More Production •

In *Spinning*

Fewer Ends Down • Stronger, More Uniform Yarns • Increased Spinning Production • More Yarn Per Package •

Proxol scours easily—regardless of the storage period. It won't heat up on storage . . . won't develop odors or discolorations. It's efficient...it's safe...it's economical. Try Proxol for a month and you'll understand why more and more textile men agree that it's today's "best buy" in wool oils.

PROCTER & GAMBLE PROXOL MADE IN U.S.A.

—made by the makers of Olate, Orvus and Profine

Procter & Gamble CINCINNATI, OHIO

NYTRON

TRADE MARK REG. U.S. PAT. OFF.

offers A DIFFERENT COMBINATION OF PROPERTIES

FOR TEXTILE PROCESSING

NYTRON, Solvay's new, low-cost wetting agent-detergent, offers a new combination of properties to the textile processing industry . . . a combination available in no other synthetic organic detergent. Add NYTRON to soaps, acids and alkalies . . . try it for soaping-off, dye leveling, scouring and all other wet processes where wetting, penetration, detergency and rinsability are important factors.

NO OTHER SYNTHETIC ORGANIC DETERGENT CAN MATCH NYTRON'S EXCLUSIVE COMBINATION OF PROPERTIES

EXCEPTIONAL DETERGENCY—in cold or hot water . . . retains its detergent action when used in either acid or alkaline mediums

EXCELLENT WETTING—reduces wetting time from hours required in plain water to a matter of seconds

QUICK, THOROUGH RINSING—even in cold water; does not leave an insoluble deposit

COUNTERACTS HARD WATER DIFFICULTIES—will not form hard water curd; more economical because increased quantities do not have to be added to compensate for water hardness

REMAINS CHEMICALLY STABLE—under widely varying conditions of temperature, acidity or alkalinity

EXCELLENT EMULSIFYING POWER—removes oil and greases from fabrics and surfaces

HIGH AND RAPID SOLUBILITY—goes into solution almost instantly even in cold water; will not "salt out" in concentrated solutions of many acids, alkalies or metallic salts

REDUCES SURFACE TENSION—addition of only 3½ ounces to 100 gallons of water will reduce surface tension by more than 50%; this action is actually enhanced under hard water conditions

Use NYTRON *for Wools, Nylons, Rayons, Cottons*

- **scouring prior to yarn and cloth dyeing**
- **rope soaping of dyed cloth**
- **a penetrating and leveling agent in dyeing operations**
- **carbonizing of wool (wetting and penetrating)**
- **scouring woolen, rayon and nylon piece goods**
- ***many other operations***

A SOLVAY PRODUCT

Samples of NYTRON are available on request. Mail this coupon now for your free sample—no obligation.

SOLVAY SALES DIVISION, Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.

I want to see for myself how NYTRON—the new type of synthetic organic detergent with the exclusive combination of properties—can improve my textile operations. Please send me a free sample.

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

BF-3

streamline your textile processes with "high-light" Kreelon

Want to make better goods . . . faster . . . cheaper? You can do it with Wyandotte "high-light" Kreelon*. That is, *if* you use Kreelon creatively. Here's what we mean. Kreelon is highly soluble in water . . . more *totally* soluble than any other detergent of this type we've tested. That means Kreelon is easier-rinsing. Creative suggestion: experiment with the time period allotted to rinsing, the amount of water you use, and its temperature. Chances are you'll save money on water and fuel.

Here are some facts on "high-light" Kreelon for your creative use: Kreelon is stable in acid, alkaline or neutral solutions. (Suggestion: you need not scour in an alkaline media.) Kreelon works more quickly than soap in most operations and at lower temperatures. (Suggestion: you can reduce processing time in scouring, dyeing and acetate saponification.)

Reg. U. S. Pat. Off.

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan • *Offices in Principal Cities*

Wyandotte
REG. U. S. PAT. OFF.

*KERANOL nk®

gives woolens, cottons and rayons a very desireable, soft full hand...

***Durable to Washing and Dry Cleaning**

Your woolen, cotton and rayon fabrics finished with KERANOL N K will have a truly mellow, glove-like hand, durable to washing and dry cleaning. KERANOL N K is unaffected by variable pH values, so may be used with greatest efficiency in neutral, alkaline or acid baths.

Mail the coupon for further information.

Additional – and highly valuable – use of KERANOL N K: as a plasticizer and softener in conjunction with all types of resin finishes.

EXCELLENT RESISTANCE TO YELLOWING!

Arkansas Co., Inc.
184 Foundry St.
Newark, N. J.

Gentlemen:
Please send, without obligation:

- ☐ full details on KERANOL N K
- ☐ sample and application procedure
- ☐ please have representative call

NAME_____ TITLE_____

FIRM NAME_____

ADDRESS_____

CITY_____ STATE_____

Arkansas Co. INC.

MANUFACTURERS OF INDUSTRIAL CHEMICALS FOR OVER 45 YEARS
NEWARK, NEW JERSEY

1-3-1

fine for fancy fabrics

If you are using a reel machine on fancy rayon piece goods, such as upholstery or draperies, you'll find Santomerse No. 1 a hard-working and efficient helper. Santomerse No. 1 has proved itself in numerous textile operations on cottons, synthetic fibers and wool.

Santomerse No. 1, an alkyl aryl sulfonate with a minimum of 40% active ingredient, is the *all-purpose* detergent and wetting agent. It is a highly efficient detergent, a rapid wetter and penetrant, an easy rinser that holds particles of soil and unattached dyestuffs in suspension so they cannot settle on fabrics. It helps avoid crocking and aids in level dyeing.

Santomerse No. 1 is efficient in hard or soft water . . . in hot or cold solutions . . . in acid or alkaline baths. In hard water, anionic Santomerse No. 1 prevents the formation of insoluble metallic soap curds.

For information on the use of Santomerse No. 1 in any textile operation, contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO
CHEMICALS — PLASTICS

MONSANTO DETERGENTS, PENETRANTS, WETTING AGENTS

Anionic	Nonionic
Santomerse* No. 1	Sterox* SE
Santomerse S	Sterox SK
Santomerse 30X	Sterox No. 5
Santomerse No. 3	Sterox No. 6
Santomerse No. 3 Paste	Sterox CD (Nonfoaming detergent)
Santomerse D	

*Reg. U. S. Pat. Off.

SERVING INDUSTRY . . . WHICH SERVES MANKIND

• FORDS, NEW JERSEY

• CALUMET CITY, ILL.

Catalin

Uniform Quality **UREA FORMALDEHYDE**

RESINS & PASTES FOR TEXTILE FINISHING!

The facilities of the Catalin Corporation of America . . . pioneer resins and plastics producer . . . include large modern processing plants at Fords, N. J., Calumet City, Ill. and huge capacity storage tank installations at Thomasville, No. Carolina. From these central locations, users in the East, Mid-west and South are assured a quickness of delivery that precludes their need to maintain large inventories. As a protection against contamination, all shipments are made in lined drums.

Catalin welcomes the opportunity to submit samples. We maintain a staff of experienced resin technicians, familiar with the problems of textile finishers. Inquiries invited.

CATALIN CORPORATION OF AMERICA · ONE PARK AVE., NEW YORK 16, N. Y.

FOR DE-SIZING

RAPIDASE®

Heat-stabilized amylolytic enzyme preparation, liquid. Solubilizes starch sizing in cotton, rayons and mixed goods . . . at extremely high temperatures. *De-size faster at lower cost with Rapidase.*

RAPIDASE-M **Intermediate strength—with all the characteristics, quality and value of Rapidase. For those who prefer a de-sizing agent of higher concentration.**

RAPIDASE-CONCENTRATED **For those whose needs demand a de-sizing preparation of highest unit strength. Because of its high concentration, greater economy is obtained in freight handling and storage expense.**

ZYMEX®

A powdered amylolytic enzyme preparation in high concentration. For those who prefer the convenience of a powdered enzyme . . . with all the advantages and economy of Rapidase.

SERIZYME®

Proteolytic type liquid de-sizing agent. For de-sizing fabrics containing gelatin, casein, soya and other protein and albuminous sizes. Produces a finer, softer hand, more uniform quality, clearer cross dyes.

In conjunction with any enzyme preparation . . . SACON . . . a non-ionic wetting agent and detergent. It is compatible with enzymes and is applicable in neutral, acid or alkaline solutions.

Our technicians are available to visit your plant on request . . . Write for booklet.

WALLERSTEIN COMPANY, INC. 180 MADISON AVENUE, NEW YORK 16, N. Y.

use BECCO HYDROGEN PEROXIDE and BECCO PROCESSES for WOOL BLEACHING

Blanket wool, women's coat and dress goods, knitting yarns—indeed, wool in any form—becomes a bright, permanent white in color or is ready for dyeing in pure and delicate pastels when bleached with BECCO Hydrogen Peroxide.

For carpet wool in stock or yarn, hydrogen peroxide reduces the shade variations of natural wool so that dyeing gives the superb quality of uniform, true, and brilliant colors to the finished product.

BECCO Processes are simple, and precisely controlled . . . kind to the fibers . . . the result of years of laboratory study and proved operation in the hands of successful manufacturers who bleach raw stock, top, yarn, and fabric.

BECCO representatives can help you as they have helped others in the profitable application of BECCO Hydrogen Peroxide and BECCO Processes to your bleaching problems. BECCO SALES CORPORATION, Sales Agent for BUFFALO ELECTRO-CHEMICAL COMPANY, INC., BUFFALO 7, N. Y. • BUFFALO • BOSTON CHARLOTTE • CHICAGO • NEW YORK • PHILADELPHIA

BECCO SALES CORPORATION
Buffalo 7, New York

We are interested in further information on the bleaching of . . .

☐ Wool stock ☐ Wool top ☐ Wool yarn ☐ Wool fabric

☐ Other Wool products_____

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____ ADR-3-51

YOU CAN TEACH AN OLD TEXTILE NEW TRICKS!

Old or new, textiles can be made to perform better, serve longer, with the help of Stein Hall products. Our laboratory technicians continually scrutinize the textile industry, searching for new ways to improve our products for warp sizing, printing, and finishing fabrics.

Stein Hall has been working with textiles for many years, endlessly testing under expert supervision in controlled laboratories. Our success is measured by the efficiency of the operation in *your* plant. The benefits of our 85 years of experience are yours for the asking. For any textile problem, call for one of Stein Hall's trained salesmen.

Write for Quotations, Free Samples and Consultation.

STEIN SH HALL

285 MADISON AVENUE NEW YORK 17, N. Y.

EST. 1946

Textile Laboratories in Providence, New York, and Charlotte. Branch offices in 16 cities in the U. S. and Canada.

having trouble dyeing nylon?

Dyeing Nylon is no problem when you make the proper selection of dyestuff and use the correct dyeing procedure. If you run into difficulty dyeing

- filament-Nylon piece goods
- spun-Nylon piece goods
- 100% Nylon or blends of Nylon with acetate or wool
- knitted piece goods
- hosiery

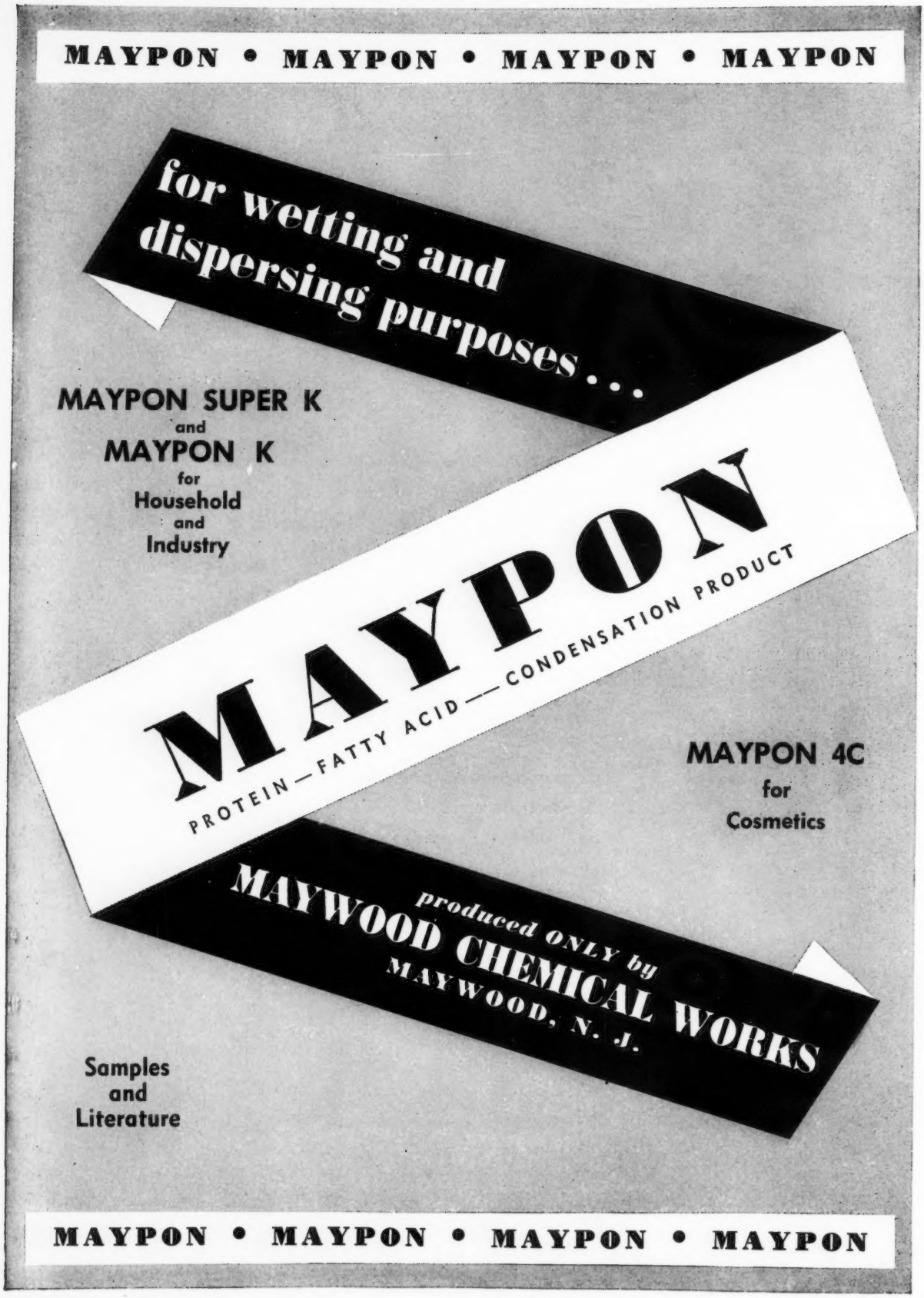
communicate with our nearest office. The accumulated experience of our Technical Department will be at your service. We will furnish the samples and formulas you require.

GDC

GENERAL DYESTUFF CORPORATION

435 HUDSON STREET • NEW YORK 14, NEW YORK

BOSTON • CHARLOTTE • CHICAGO • PHILADELPHIA • PORTLAND, ORE. • PROVIDENCE • SAN FRANCISCO


MAYPON • MAYPON • MAYPON • MAYPON
for wetting and dispersing purposes . . .
MAYPON SUPER K
and
MAYPON K
for
Household
and
Industry
MAYPON
PROTEIN—FATTY ACID—CONDENSATION PRODUCT
MAYPON 4C
for
Cosmetics
produced ONLY by
MAYWOOD CHEMICAL WORKS
MAYWOOD, N. J.
Samples
and
Literature
MAYPON • MAYPON • MAYPON • MAYPON

for plain and cross dyeing of acetate fibers

THE bright golden color of Eastman Fast Yellow 4RLF combined with exceptional fastness to gas and light has earned for this Eastman dye high praise in houses handling drapery, upholstery and suiting fabrics.

EASTMAN FAST YELLOW 4RLF

In pastel shades twenty-five-to forty-hour light-fastness is obtained; and, of the fast-to-light acetate yellows, Eastman Fast Yellow 4RLF is one of the fastest with respect to washing.

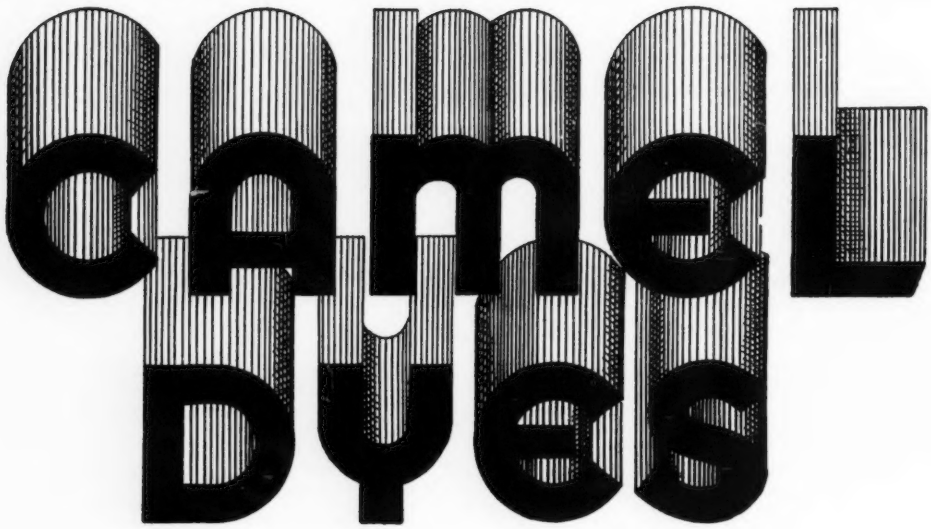
It is highly recommended for cross dyeing, even in heavy shades.

When you need a yellow with lasting color—when gas, light and wash fastness are vital factors—use Eastman Fast Yellow 4RLF.

We will be pleased to send you detailed information and sample quantities of Eastman Fast Yellow 4RLF for your evaluation—Tennessee Eastman Company, division of Eastman Kodak Company, Kingsport, Tennessee.

• Eastman Acetate Dyestuffs are sold in the United States through Tennessee Eastman Company in Kingsport, Tennessee, and Lodi, New Jersey. On the West Coast, through Wilson & Geo. Meyer & Co.: San Francisco, Los Angeles, Portland, and Seattle. In Canada, through Clough Dyestuff Company Ltd., 33 St. Mathieu Street, St. Laurent, Quebec.

Eastman Acetate Dyestuffs



THE CAMEL LINE OF
DEPENDABLE DYESTUFFS

has served the textile mills of America without interruption since 1876.

This broad experience assures
PROMPT • EFFICIENT • ECONOMICAL SERVICE
TO MEET ALL DYESTUFF REQUIREMENTS

JOHN CAMPBELL & COMPANY, Inc.

75 HUDSON STREET • NEW YORK CITY
TELEPHONE: BArclay 7-6228-6229
2520-22 NORTH BROAD STREET, PHILADELPHIA 32, PA. • TEL. RADCLIFFE 5-7103-4
BRANCH OFFICES AND WAREHOUSES:
BOSTON | EAST CLEVELAND, OHIO | ATLANTA, GA.

XYNOFIX FL

A

READILY AVAILABLE

ECONOMICAL

FIXING AGENT

for

PRACTICALLY ALL TYPES

of

DYESTUFF APPLICATIONS

Write for data sheets on specific applications.

onyx CHEMICALS FOR DYEING • FINISHING • PRINTING

ONYX OIL & CHEMICAL COMPANY

TEXTILE DIVISION

190 WARREN ST., JERSEY CITY 2, N. J.

CHICAGO • BOSTON • CHARLOTTE • ATLANTA

In Canada: Onyx Oil & Chemical Co., Ltd., Montreal, Toronto, St. Johns, Que. *For Export: Onyx International, Jersey City 2, N. J.*

NYANZA

for
WOOL
COTTON
RAYON
ACETATE
NYLON
and
MIXED FIBERS

TEXTILE
CHEMICALS

ANILINE
and
ALIZARINE
COLORS

NYANZA COLOR & CHEMICAL COMPANY, Inc.

109 WORTH STREET • NEW YORK 13, N. Y.

FACTORIES:

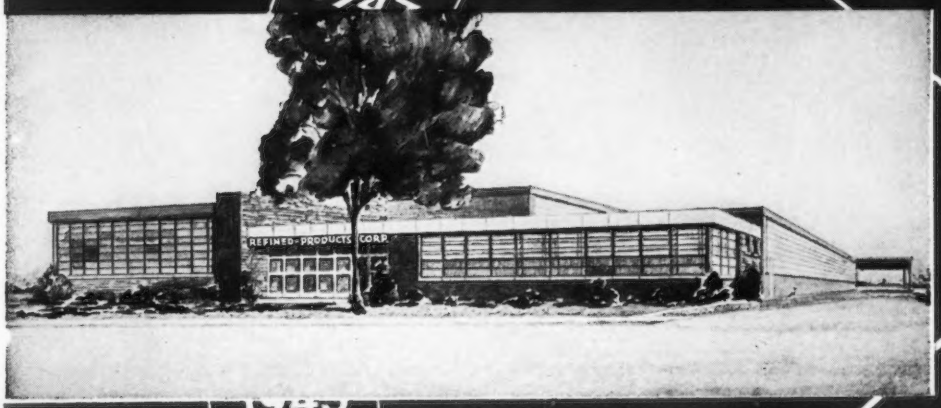
CHEMICAL MANUFACTURING CO., ASHLAND, MASS. NEW BRUNSWICK CHEMICAL CO., NEWARK, N. J.

BRANCHES:

549 West Randolph St. CHICAGO 6, ILL. 675 Drexel Bldg. PHILADELPHIA 6, PA. ASHLAND, MASSACHUSETTS 115 S.W. Fourth Ave. PORTLAND 4, ORE. 304 E. Morehead St. CHARLOTTE 3, N. C.

CANADIAN AGENTS: Charles Albert Smith Limited, 123 Liberty St., TORONTO, CANADA

1951
1950
1949
1948
1947
1946
1945
1942
1941
1940
1939
1938



REFINED PRODUCTS CORPORATION

Our customers profit by our expansion

Extensive chemical research laboratories and ultra modern processing equipment produce better products more economically.

For more than 12 years we have manufactured chemical specialties for the textile and allied industries.

General information sheets on all products are available.

We suggest that you write for complete set.

REFINED PRODUCTS CORPORATION

Manufacturing Chemists

LYNDHURST NEW JERSEY

Manufacturers of PRIMA-CIDE, the approved, outstanding, mildew-proofing agent

Southern Representative: DYER S. MOSS COMPANY, 2511 Laurel St., Charlotte 6, North Carolina

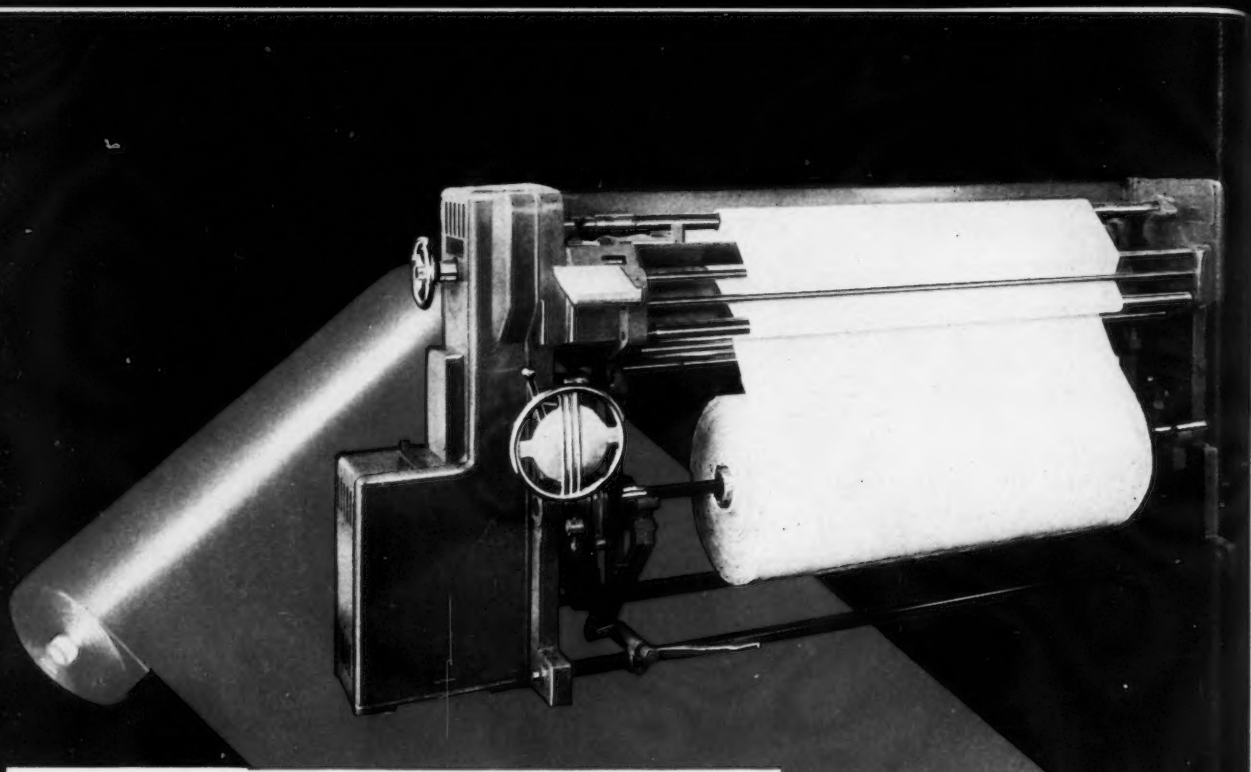
New England Representatives: R. L. LEOG, 8 Harding Ave., Providence, R. I.
DONALD E. MacLEAN, Box 282, So. Dartmouth, Mass.

California Representative: SIDNEY SPRINGER, 2300 S. Vermont Ave., Los Angeles 7, California

Pennsylvania, Maryland, Delaware Representative JOSEPH E. COOGAYAGE, Pine Rd., Huntington Valley, Pa.

Canadian Selling Agents: National Color & Chemical Company, 43 Hughson St., North, Hamilton, Ontario

Export Division Manager: Chester Fell, Refined Products Corp.



The VAN VLAANDEREN Constant Cloth Speed TUBER

A Smooth Performer

Most modern fabrics benefit by tensionless processing in the wet stage. Control of tension when *tubing* also has definite advantages, giving a better package, accurately measured.

CONSTANT CLOTH SPEED up to 200 yards per minute is possible, under controlled tension from near tensionless to medium tension. Package density is uniform as predetermined.

ACCURATE MEASURING is given at all times, since tension between let-off and take-up can be reduced to the minimum. as the measuring drum is a driven unit of the machine. Measuring roll is non-corrosive with a long-wearing finish and mounted on a moveable carriage for easy selvage alignment.

THE V. V. CONSTANT CLOTH SPEED TUBER is easily and quickly loaded. Start, let-off, take-up and measuring drum are all synchronously controlled by one foot pedal. Stop brake is controlled by hand lever.

Ask to see this machine in operation.

The machine illustrated is also available with conventional, variable cloth speed for those who do not require the tensionless feature. Improved from time to time to meet increasingly exacting requirements, this machine has consistently given superior packaging performance.

VAN VLAANDEREN MACHINE COMPANY

370 Straight Street • Paterson 3, New Jersey

Cable address: Vlaanderen, Patersonnj, U.S.A.

World's largest manufacturer of machinery for processing modern fabrics

TRANSGO THE HOSIERY INDUSTRY'S TRANSFER ERADICATOR

tuned to the changes of a woman's mind

Twice a year fashion dictates a change in hosiery colors. Transgo, Fancourt's special formula transfer remover, will help you meet this change and beat competition. Transgo is sure . . . fast . . . and will not affect any of the properties of the goods. With Transgo, hosiery is easily processed for redyeing and obsolete stock is profitably turned into the fashion hues of the day.

Transgo is just one of the many Fancourt products that have been tested and proved by leading mills throughout the country. Wire, write or phone today for complete details—Your Fancourt fieldman has the answer to your finishing problems.

WFF *making more sales—more easily—for more people*

W. F. FANCOURT CO.

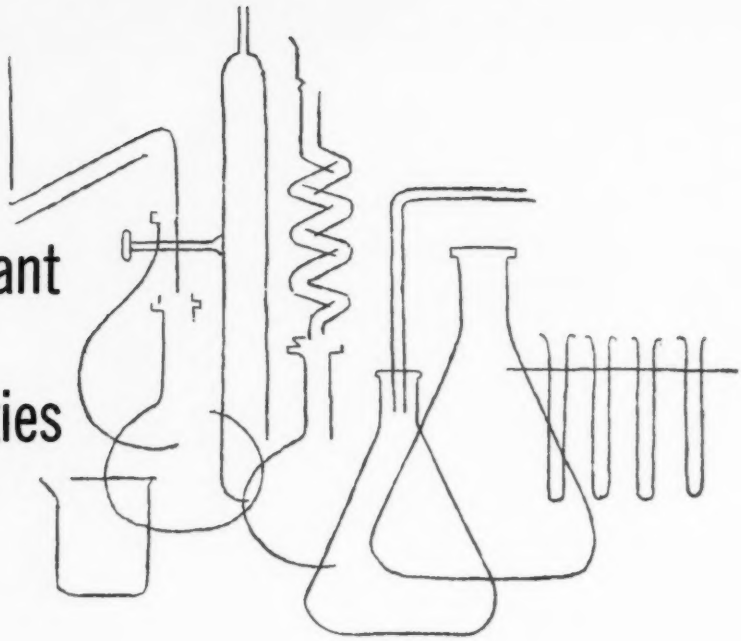
PHILADELPHIA 47, PA.

SOLVING FINISHING PROBLEMS SINCE 1904

IN THE SOUTH—HOWARD A. VIRKLER

3608 STARMOUNT DRIVE, GREENSBORO, N. C.

check your textile chemical needs with Warwick's important series of chemical specialties for the textile industry



ANTILUSTROLE* dullers
APPRAMINE* cationic softeners
APPRETOLE* anionic softeners
EUMERCIN* mercerizing assistants
FORMASET* textile resins
IMPREGNOLE* and NORANE* water repellents
LANOLE* tar and grease removers
ORGANOSOL coatings for textiles and paper
PLASTISOL for coating and molding
SETOLE* textile resins
SULFANOLE* synthetic detergents
WARCOFIX* color fixatives
WARCO GFI* gas fading inhibitor
WARCOLENE* finishing oils
WARCONYL* fire retardants
WARCOSAN* wetting and rewetting agents
WARCOSOL* penetrants
WEAVE-LOK* non-slip finish

Warwick technical advisors, with their wide knowledge of textile chemicals and processes, are available for consultation.

SUNTONE*
pigment printing colors for textiles and plastics

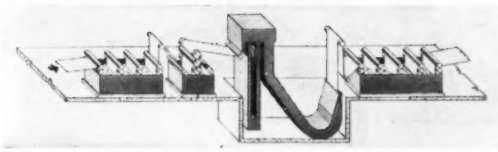
WARWICK CHEMICAL COMPANY

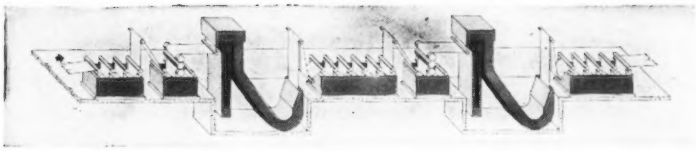
WARWICK CHEMICAL COMPANY, DIVISION Sun CHEMICAL CORPORATION 10th STREET and 44th AVENUE, LONG ISLAND CITY, NEW YORK
*REG. U. S. PAT. OFF.

BOOST BLEACHING OUTPUT and CUT COSTS

with these Du Pont Continuous Peroxide Bleaching Systems

ONE-STAGE OPEN-WIDTH SYSTEM
Capacity: Up to 1500 lbs. per hour





TWO-STAGE OPEN-WIDTH SYSTEM
Capacity: Up to 3000 lbs. per hour

IF YOU PLAN to modernize your bleachery, expand production, especially for speedy, economical handling of heavy fabrics, investigate the Du Pont Open-Width Systems. They are by far the most economical units of this type developed to date.

Introduced by Du Pont in 1943, they're specifically designed to handle heavy fabrics and tightly woven goods—heavy twills, drills, poplins, etc. They speed bleaching, cut costs in chemicals, steam and maintenance. Today, 16 of these systems, incorporating Du Pont principles, are operating in a number of leading mills.

Other types of Du Pont continuous systems, with capacities from 500 to 6,000 lbs./hr., are available. In fact, capacity of Du Pont designed installations operating or under construction is now over 75,000,000 yards per week—more than one-fourth the current annual U. S. production of cotton piece goods!

Let us tell you more about these cost-saving systems. We don't build or sell the equipment. But our Technical Service can help you select the right bleaching system for your requirements of production, type of fabrics to be bleached, utilities, and other economic factors. Bleaching specialists will help you survey your production facilities, make specific recommendations on equipment, give estimates and operating costs. After you decide on a system, Du Pont Technical Service representatives located in leading textile centers will help you start operation and train your technical and operating personnel. This service in no way obligates you.

For further information on Du Pont Continuous Peroxide Bleaching Systems, send the coupon below.

Tune in Du Pont "Cavalcade of America," Tuesday nights—NBC coast to coast

DU PONT
CONTINUOUS PEROXIDE BLEACHING

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department, Wilmington 98, Del.

Please send me more information about Du Pont Continuous Peroxide Bleaching Systems.

Name_____ Title_____

Firm_____

Street & No._____

City_____ State_____

When Granite Hosiery Changed to *Evenate

They noticed the difference at Granite Hosiery Company after adding Evenate to the dyebath . . .

—boarders and pairers reported a marked improvement in unions between monofilament boots and welts of multifilament yarns

—dyehouse reported increased production because of fewer redyes

Evenate is outstanding for extremely level dyeing results. It assures better dye penetration, shorter dyeing time. Pairing speed is increased because there are more firsts as pairs.

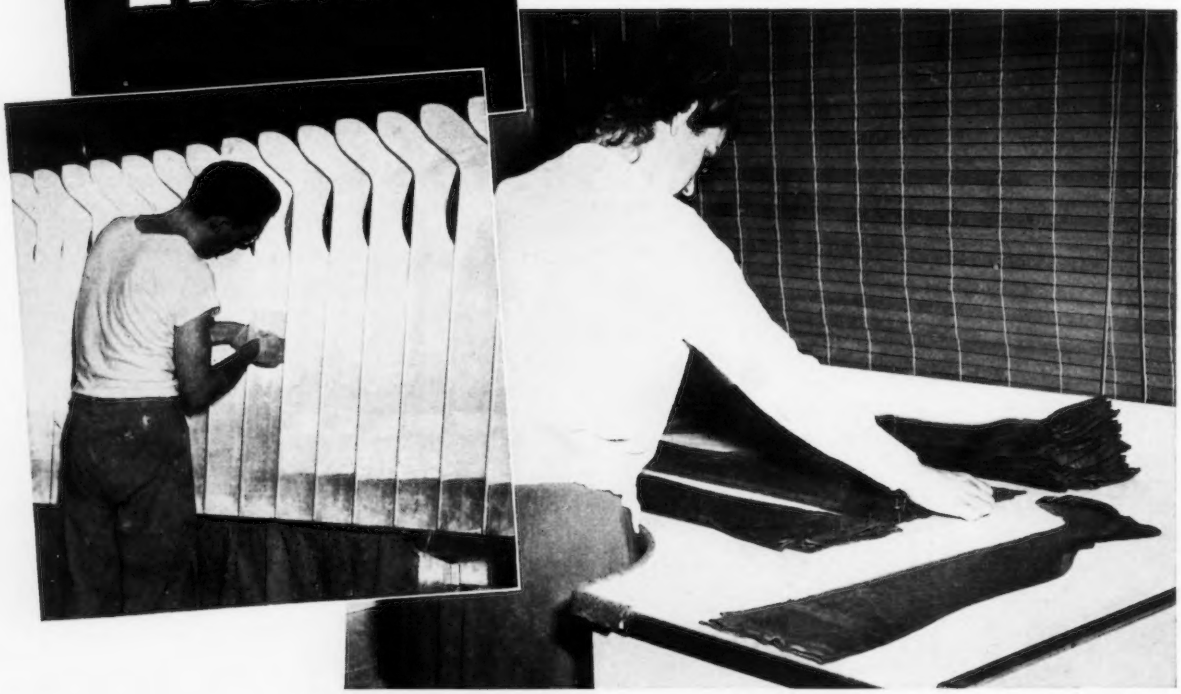
There is no sudsing in the dyebath with Evenate. Works equally well with acid colors and acetate dyes. Evenate also makes redyeing more economical. Reduces the number of shade variations in mixed dye lots.

Try Evenate on underwear fabrics, too—knit goods, woven nylon, laces. Write for full details.

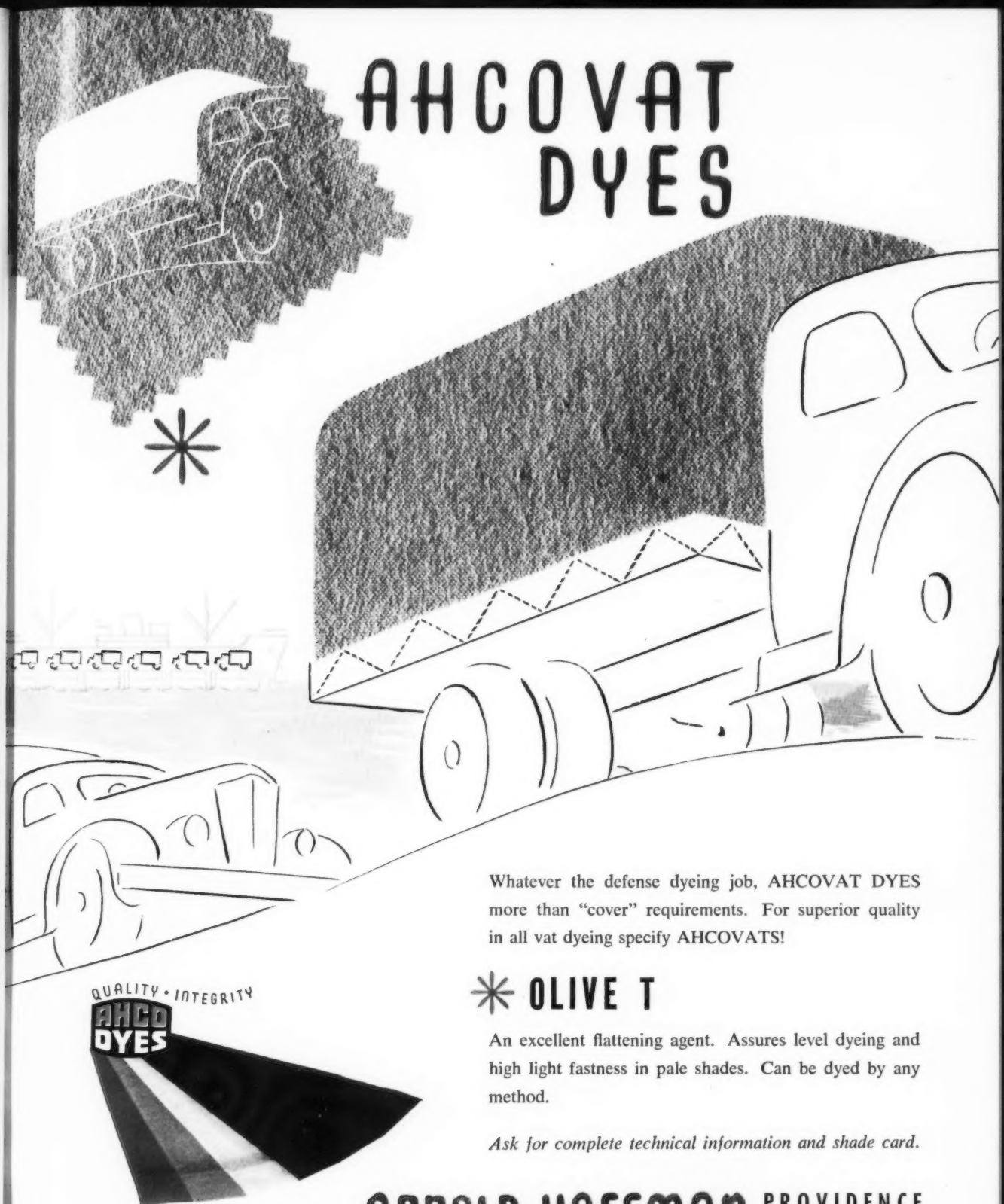
AMALGAMATED CHEMICAL CORPORATION
Philadelphia 34, Penna.
Southern Division: 1819 Spring Garden St., Greensboro, N. C.

Amalgamated

*Evenate is a thin paste readily soluble in the dyebath. It is a non-ionic condensate combined with a glyceride.



AHCOVAT DYES



Whatever the defense dyeing job, AHCOVAT DYES more than "cover" requirements. For superior quality in all vat dyeing specify AHCOVATS!

✳ OLIVE T

An excellent flattening agent. Assures level dyeing and high light fastness in pale shades. Can be dyed by any method.

Ask for complete technical information and shade card.

ARNOLD, HOFFMAN PROVIDENCE RHODE ISLAND

Associated with
Imperial Chemical Industries, Ltd.
(DYESTUFFS DIVISION)
England

ARNOLD, HOFFMAN & CO., INCORPORATED • EST. 1815 • PROVIDENCE, R. I.
Offices: Charlotte, Cincinnati, New York, Philadelphia, Providence
Plants: Charlotte, N. C. Cincinnati, Ohio Dighton, Mass.

CONFIDENCE!

Your hidden specification . . . but nevertheless your most important consideration.

Experience and know-how obtained through years of specialization in the manufacture of Fatty Acids is indicative of A. Gross & Co.

Confidence in A. Gross & Co. Fatty Acids is assured by the utilization of the most modern plant facilities and equipment available . . . but this alone is only part of the story.

Whether you are looking for

Red Oil
Stearic Acid
Coconut Fatty Acids
Cottonseed Fatty Acids
Soyabean Fatty Acids
Tallow Fatty Acids

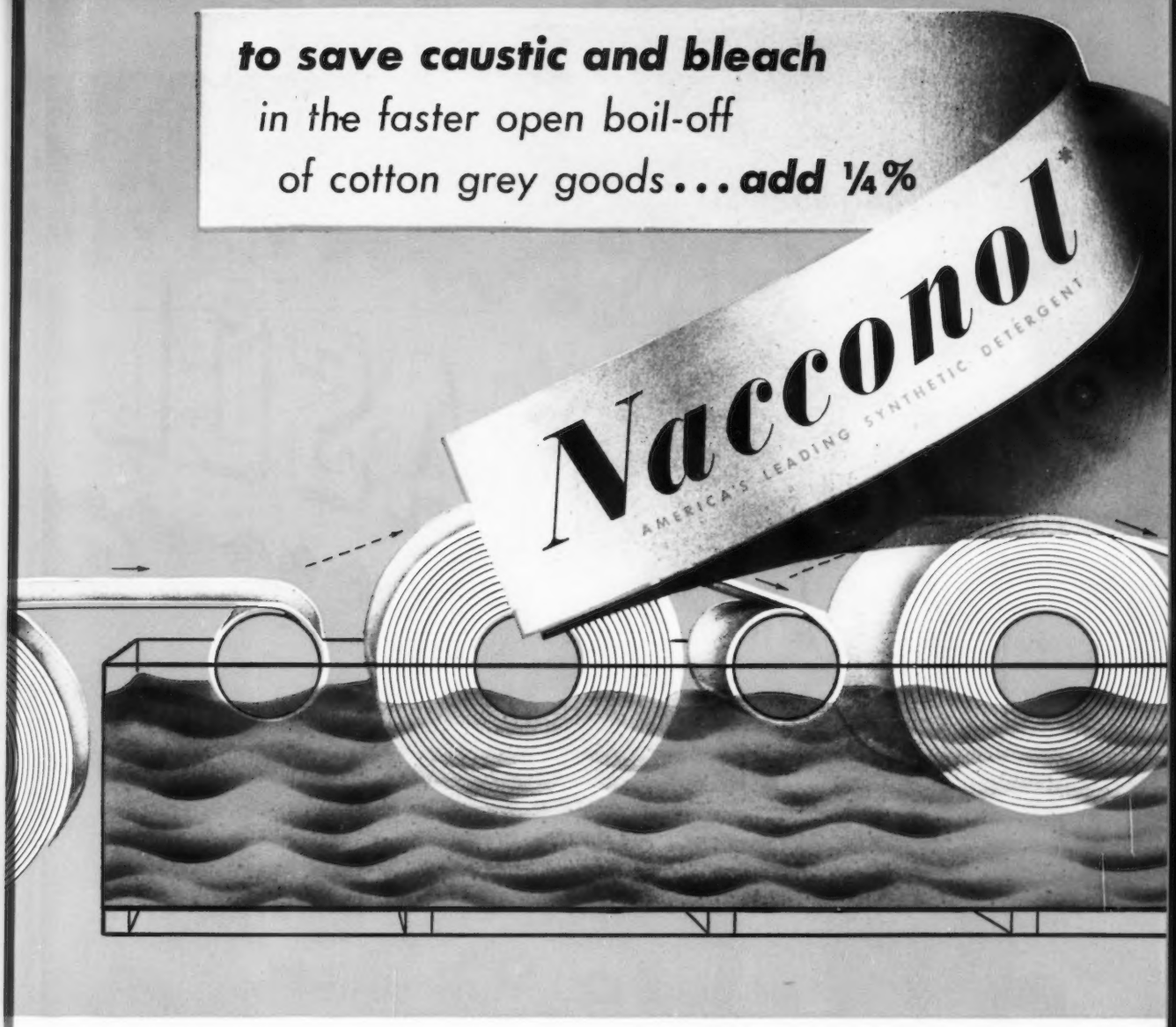
Distributors in Principal Cities

A. GROSS & Company

295 MADISON AVENUE • NEW YORK 17, N. Y.
Factory: Newark, N. J.

MANUFACTURERS SINCE 1837

to save caustic and bleach
in the faster open boil-off
of cotton grey goods... **add ¼%**



Mill results confirm carefully-conducted tests that show you can cut costs three ways by adding as little as ¼% NACCONOL to the boil-off liquor:

1. *Save Caustic:* **A 1% Caustic plus ¼% Nacconol solution can be as effective as much higher alkali concentrations without NACCONOL.**
2. *Save Bleach:* **Cleaner, wax-free goods cuts bleach-solution consumption.**
3. *Save Time:* **Satisfactory boil-off can often be obtained in less than half the time.**

send for technical bulletin

National Technical Bulletin #311 contains 12 pages of significant test results on this important way to save time and money on boil-off operations. For your copy, write, wire or phone our nearest office.

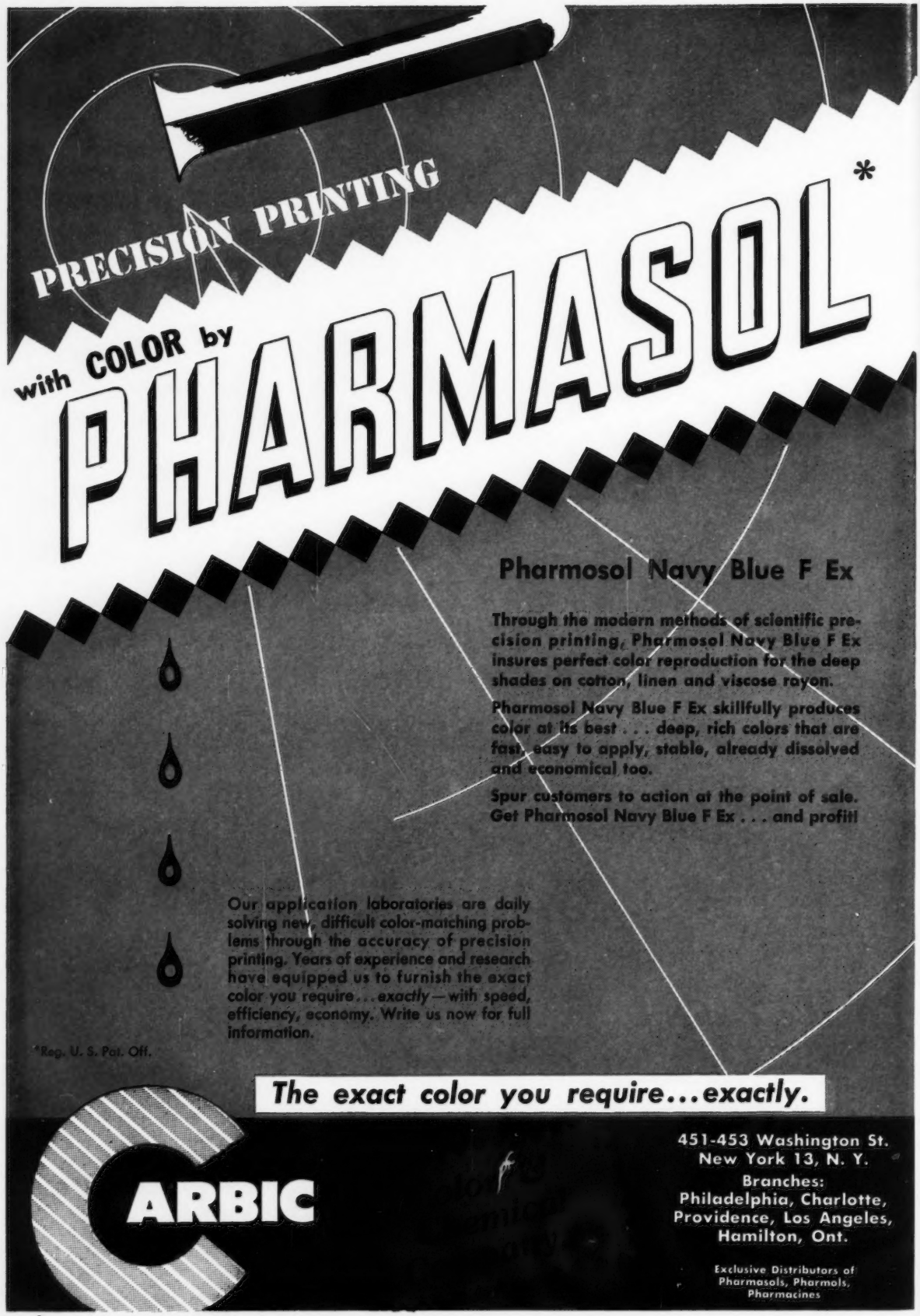
NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N.Y. • BOwling Green 9-2240

Boston 14, Mass., 150 Causeway St.	CApitol 7-0490	Richmond 19, Va., 8 North Fifth St.	Richmond 2-1930
Providence 3, R.I., 15 Westminster St.	DExter 1-3000	Columbus, Ga., Columbus Interstate Bldg.	Columbus 3-1029
Philadelphia 6, Pa., 200-204 S. Front St.	LOmbard 3-6382	Greensboro, N.C., Jefferson Standard Bldg.	GReensboro 2-2518
San Francisco 5, Cal., 517 Howard St.	SUtter 1-7507	Chattanooga 2, Tenn., James Building	CHattanooga 6-6347
Portland 9, Ore., 730 West Burnside St.	Beacon 1853	Atlanta 2, Ga., 140 Peachtree St.	CYPress 2821
Chicago 54, Ill., The Merchandise Mart	SUperior 7-3387	New Orleans 16, La., 714 Carondelet Building	Raymond 7228
Charlotte, 1 N.C., 201-203 West First St.	CHarlotte 3-9221	Toronto 2, Canada, 137-143 Wellington St. W.	Elgin 6495

*Reg. U. S. Pat. Off.


PRECISION PRINTING
with COLOR by
PHARMASOL*
Pharmosol Navy Blue F Ex
Through the modern methods of scientific precision printing, Pharmosol Navy Blue F Ex insures perfect color reproduction for the deep shades on cotton, linen and viscose rayon.
Pharmosol Navy Blue F Ex skillfully produces color at its best . . . deep, rich colors that are fast, easy to apply, stable, already dissolved and economical too.
Spur customers to action at the point of sale. Get Pharmosol Navy Blue F Ex . . . and profit!
Our application laboratories are daily solving new, difficult color-matching problems through the accuracy of precision printing. Years of experience and research have equipped us to furnish the exact color you require . . . exactly—with speed, efficiency, economy. Write us now for full information.
*Reg. U. S. Pat. Off.
The exact color you require...exactly.
CARBIC
451-453 Washington St.
New York 13, N. Y.
Branches:
Philadelphia, Charlotte,
Providence, Los Angeles,
Hamilton, Ont.
Exclusive Distributors of
Pharmasols, Pharmols,
Pharmacines

AMERICAN

DYESTUFF REPORTER

NORMAN A. JOHNSON
Editor

CHARLES A. WHITEHEAD
Managing Editor

MYRON D. REESER
Advertising Manager

HERBERT A. STAUDERMAN
Advertising Representative

GRACE B. BURTON
Production Manager

M. H. MORGAN
Circulation Manager

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

•

American Dyestuff Reporter was founded in 1917 and the Textile Colorist and Converter (formerly Textile Colorist) was incorporated with it in January, 1949. Published every other Monday by the **HOWES PUBLISHING COMPANY, INC., 44 E. 23rd Street, New York 10, N. Y. C. R. Howes,** President; **Harry F. Crawford,** Executive Vice-President; **Norman A. Johnson, Myron D. Reeser,** Vice-Presidents; **Ernest J. Finan,** Treasurer; **C. Essenbreis,** Secretary.

•

Also Publishers of
HOSIERY INDUSTRY WEEKLY
HOSIERY MERCHANDISING

•

MARCH 5, 1951
VOLUME 40 NUMBER 5

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library

• Special Articles

Fulling Characteristics of a Light-Weight Woolen Fabric 145
Kermit S LaFleur

• Departments

Patent Digest 148
Paul Wengraf

Abstracts 169

News 170

• Proceedings of the American Association of Textile Chemists and Colorists

Calendar P149

Dr Weidmann to Speak at N Y Section Meeting...P149

One Hundred and Seventy-Fifth Council Meeting..P149

One Hundred and Sixty-Fifth General Research Committee Meeting P152

Synthetics Group:—
Odor Prevention in Resin Treated Fabrics.....P154
L A Fluck, G J Keppler, T F Cooke and C L Zimmerman

Employment Register P160

Membership Applications P160

General Technical Session:—
A Business Approach to Consumer Standards..P161
Thomas C Blaisdell, Jr

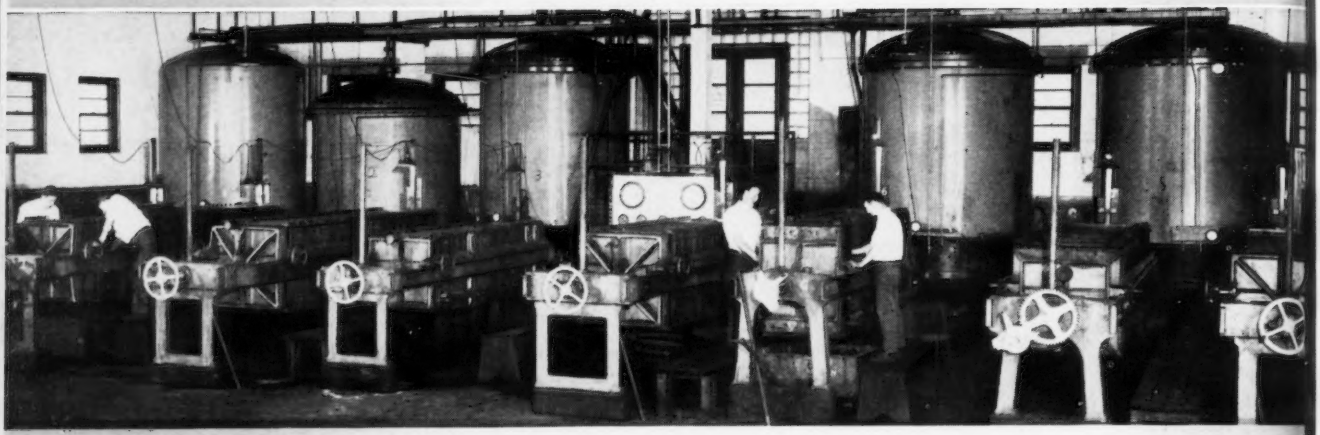
Auxiliaries and Testing Group:—
The Measurement of Static Electricity on Fabrics.P164
Mason Hayek and F C Chromey

Copyright, 1951, Howes Publishing Co., Inc.

non-corrosive, modern presses

eliminate rust

to give you a **superior product**



Here at Althouse, non-corrosive, modern presses, plus other built-to-order equipment (such as special metal fittings, valves, pumps made of Hasteloy C) are used, so that our dyestuffs NEVER come in contact with any Corrosive Metals while in the wet stage. This PRECISION Dye-Making *eliminates* the Dyers' Enemy Number One . . . CONTAMINATION. Althouse superior dyestuffs enable YOU to produce a superior product!

ALTHOUSE

Chemical Company, Inc.

READING, PENNSYLVANIA

Pace-setter in precision dye-making

AMERICAN
DYESTUFF REPORTER

VOLUME 40 MARCH 5, 1951 NUMBER 5

FULLING CHARACTERISTICS OF A LIGHT-WEIGHT WOOLEN FABRIC

KERMIT S. LaFLEUR
Farnsworth Mill, Lisbon Center, Me.

A comparison of the felting properties of various media has been made on the basis of (1) rate and degree of felting, and relative irreversibility of felt produced (2) relative freedom from wrinkles and cemented folds, and (3) desirable hand.

Products which are fat-derived to a high degree (e g, soap, sulfonated tallow, quaternary fatty acid amide), and solid at a normal room temperature, seem to produce the most satisfactory felts when judged by freedom from cemented folds and kind hand, but the fulling rate of such materials is slow; it is uncertain whether slow fulling is an essential factor or merely a coincidental property of the more desirable media.

No product or combination has been found ideal for both fulling and scouring and economically acceptable. The most satisfactory individual product is soap; the most satisfactory combination products are soap (for fulling) with an alkylolamide condensate (for alkaline scouring), or sulfonated tallow (for fulling) with a polyoxyethylene condensate (for saline scouring).

While it seems quite certain that soap is not indispensable for good fulling, it is still difficult to replace satisfactorily.

INTRODUCTION

THE desirability of using chemically inert detergents in neutral solution for removing mineral oil lubricants from woolen piece goods, and the practicability of using superior, currently available products of this type have been discussed in a previous paper *(1)*.

Since the great majority of woolen fabrics must be fulled as well as scoured, a comparative study of fulling properties is essential for further progress.

The fulling of woolen piece goods has been carried out with alkaline soap solutions so long and so successfully that serious doubt exists in many minds that it can be practiced in any other way. The question of whether soap is indispensable to good fulling, or whether it can be replaced is considered in this paper.

TABLE I
REPRODUCIBILITY OF FULLING SHRINKAGE USING THE LABORATORY FULLING MILL

	Cumulative area shrinkage in							
Trial	*15'*	*30'*	*45'*	*60'*	*75'*	*90'*	*105'*	*120'*
1	29	41	49	54	58	60	63	65
2	28	39	45	52	56	60	62	64
3	34	42	51	55	58	62	64	64
4	40	47	51	57	59	63	62	63
5	31	43	49	54	58	58	61	63
6	35	43	50	55	59	61	63	64
7	33	41	48	54	57	61	63	64
Mean	33	42	49	54	58	61	63	64
Standard Deviation	3.7	2.3	1.9	1.5	1.0	1.5	1.0	0.6

LABORATORY FULLING MILL

After several attempts to design apparatus with which reproducible woolen cloth shrinkages could be obtained, a laboratory fulling mill has been built in our shop which appears to work satisfactorily. It is similar to regular fulling mills, though not built to scale. Head and width shrinkages are controlled by adjustable trap and roll pressure, which, for the present experiments were set to yield approximately equal results. It was determined empirically that 8-ounce goods 10 x 70 inches seemed well adapted to the mill, and swatches having these specifications were used in all experiments described below. The rate of fulling in this latest mill is considerably more rapid, and the degree very much greater than is normal in production; however, these differences can be minimized by decreasing trap and roll pressures, lengthening the fabric strip, and reducing the r.p.m. For initial experiments, the accelerated run seemed best suited.

The degree of shrinkage reproducibility obtained with water in the laboratory mill may be judged from the data of Table I.

TABLE II
EFFECT OF MOISTURE CONTENT UPON RATE OF FULLING

		Cumulative shrinkage in							
No.	*Water * used (%)*	*15'*	*30'*	*45'*	*60'*	*75'*	*90'*	*105'*	*120'*	*Excess moisture at end of run (%)*
1	50	31	32	32						10
2	100	31	35	42	46	44				10
3	200	24	33	41	46	51	55	58	60	45
4	400**	21	32	41	47	51	55	58	59	30

* Added initially; no further additions made.
** Splatters and squeezes out during first 15 minutes.

TABLE III

FULLING PROPERTIES OF VARIOUS MEDIA

	Conc. on weight of fabric (%)	Area shrinkage (%) in minutes							Mean tensile strength in lbs. (dry)	Mean tensile strength in lbs. (wet)	Loss of strength when wet (%)	Fulling index *	Wrinkles and/or cemented folds	Soft, harsh indeterminate or boardy	Selected for overall quality
		15	30	45	60	75	90	105	120							
Sulfuric acid	N sol.	38	48	55	60	62	64	66	66	72	53	26	1.09	P	VB-H	
Sulfuric acid	.4N sol.	26	35	41	47	50	54	56	58							
Sulfuric acid	.1N sol.	24	36	45	53	57	61	63	64							
Sulfuric acid	.05N sol.	28	36	46	49	53	57	59	61							
Water	——	31	41	49	54	58	61	63	65	62	48	22	0.95	P	I	
Sodium hydroxide	.05N sol.	25	33	38	43	47	51	52	54	54	42	22	1.00	F	B	
Sodium hydroxide	.1N sol.	25	33	39	42	45	48	51	52	54	40	28	1.04	F	B	
Sodium hydroxide	.2N sol.	24	28	33	38	42	42	45	45	47	31	33	1.04	F	B	
Thioglycollic acid	.5N sol.	56	64	68	69	71	71	71	72	74	55	25	1.03	VP	B-H	
Sodium sulfide	.1N sol.	25	36	42	43	47	49	51	51	34	25	27	0.67	F	VB	
Sodium soap (10° titre)	1	4	16	21	29	37	43	47	51	57	44	23	1.11	G	S	
Sodium soap (25° titre)	1	5	18	24	31	37	44	47	53	58	48	18	1.09	G	S	
Sodium soap (39° titre)	1	6	18	22	27	34	41	45	48	52	39	25	1.08	G	S	
Sodium soap (10° titre)	5	9	26	39	50	57	61	62	64	74	59	19	1.15	G-F	S	X
Sodium soap (25° trtre)	5	8	21	35	46	53	60	62	63	74	57	21	1.17	G	S	XX
Sodium soap (39° titre)	5	7	22	37	47	54	58	62	64	75	58	22	1.17	G	S	X
Sodium soap (25° titre)	2	5	13	22	30	38	47	51	58	62	46	27	1.07	G	S	
Sodium soap (25° titre)	3	7	17	30	39	50	55	59	63	69	54	20	1.09	G	S	X
Sodium soap (10°) + Na_2CO_3	5 + 2	4	12	26	37	45	51	54	58	65	47	28	1.12	G-F	S-I	
Sodium soap (25°) + Na_2CO_3	5 + 2	2	16	28	42	48	52	57	60	66	53	17	1.10	G	S-I	
Sodium soap (39°) + Na_2CO_3	5 + 2	6	17	29	36	43	51	55	56	63	50	21	1.12	G	S-I	
Sulfated castor oil	5	22	31	36	44	52	57	60	62	78	55	29	1.26	F-P	I	
Sulfonated tallow (36%)	5	13	30	43	51	57	59	63	67	68	58	14	1.01	E	S	XX
Fatty carbamide salt	5	4	13	22	35	44	49	53	54	73	51	30	1.35	F	S-I	X
Ethanolated alkyl guanidine	5	+ 3	6	16	26	38	46	51	55	61	52	17	1.11	E	S-I	X
Quaternary fatty acid amide	5	9	23	34	47	52	60	64	67	76	66	14	1.13	G	I	XX
Sulfonated mineral oil	5	17	35	46	55	59	62	65	67	81	64	20	1.21	F	B-H	
Alkylolamide + Na_2CO_3	1 + 2	40	49	58	63	64	66	66	67	79	61	21	1.18	P	I	
Polyoxyethylene cond. + NaCl	1 + 5	35	46	53	57	59	61	61	63	69	55	20	1.09	P	I-H	

* Fulling index = $\frac{\text{Mean (dry) tensile strength}}{\text{Area shrinkage in 120 minutes}}$

DISCUSSION OF PROCEDURE

Warpwise strips of scoured, plain weave, woolen cloth 10 x 70 inches, weighing approximately 75 grams, were sewn into the laboratory fulling mill. Two loops of thread were sewn in to mark off a 10-inch initial warp distance. 75 ml. of fulling liquid (at room temperature) were added slowly to the cloth ahead of the rolls from a separatory funnel, with the mill in motion. Warp and filling measurements were taken at the end of 15 minute intervals, and fulling continued for a total of 2 hours. Ten ml. of water were added to replace the evaporation loss after taking each set of measurements.

Selection of the moisture level was influenced by mill practice and consideration of data such as those of Table II. The moisture content necessary for fulling does not appear to be critical in the sense that an exact optimum percentage is required, but there is a minimum below which the fulling rate becomes negligible, and a maximum beyond which it is comparatively slow. Thus, very roughly, 50% excess moisture seems marginal (low), 100% excess moisture seems satisfactory, and 200% moisture, high. The optimum range lies somewhere between 50 and 100 percent. The object of the 10 ml. water increments at 15 minute intervals was to maintain the moisture content at this level. The observed mean moisture content at the completion of the 2 hour runs was 71%.

A series of tests was made with sulfuric acid and sodium hydroxide to determine the magnitude of effect of pH. The concentrations given in Table III refer to the 75 ml. of solution added initially; each 10 ml. increment at 15 minute intervals thereafter consisted of water only.

The effect of reducing agents upon area shrinkage of woolen swatches has been discussed in a previous report *(2)*. The combined effect of reduction and milling could conceivably produce rapid and high area shrinkage. To study this effect, experiments were run with thioglycollic acid and sodium sulfide.

Fulling experiments were carried out with 10, 25, and 39° titre sodium flake soaps, with and without sodium carbonate; a range of soap concentrations was studied using the soap made from intermediate titre fats.

A variety of fat-derived "softeners" was next examined, as well as products which could serve as wool lubricants, since it appeared that the functions of soap as a fulling assistant included softening and lubrication.

Finally, the two outstanding detergent solutions for self-emulsifying mineral oil soil selected from a previous study *(1)* were tried. The first solution consisted of an alkylphenolpolyoxyethylene conden-

sate and a polyoxyethylene thioether with sodium chloride; the second was a coconut fatty acid-diethanolamine condensate with sodium carbonate.

FELTING CHARACTERISTICS——— From an examination of the felts produced in the trials described, and consideration of their relative merits, it was concluded that desirable felting qualities are: (a) high degree of felting, with a high degree of irreversibility (b) freedom from wrinkles and cemented folds (c) desirable hand—fullness, softness, resilience, and (d) most rapid fulling rate consistent with these qualities.

The rate and degree of felting was measured as linear warp and filling shrinkages per unit time and calculated to area shrinkage. Tensile strength measurements were obtained in the dry state to indicate the degree of fiber entanglement; these observations were repeated in the wet state (about 100% moisture) to determine relative ease of reversibility (i.e., pulling out) of the felt. A 'fulling index' was calculated from the ratio of mean (dry) tensile strength to the area shrinkage. Relative freedom from cemented folds is a qualitative judgment, and judgments concerning desirable hand are somewhat uncertain because they are subjective; both are so relevant that they were included despite their weaknesses. Suitable means for quantitative estimates may be devised later. Data appear in Table III.

DISCUSSION

It is apparent from the data collected that fulling rates are very dependent upon the fulling medium selected.

On the basis of rapid fulling, soap and related products could not be considered good fulling agents; however, examination of the felts produced indicates that rapidity is not a criterion of overall excellence and that, in fact, the reverse is more nearly true. Fulling wrinkles and cemented folds are very prevalent in rapidly fulled swatches, particularly those run without lubrication or softening action.

Sulfuric acid produced a boardy badly wrinkled fabric, generally quite unsatisfactory.

Pieces fulled in alkaline solutions had a threadbare look and harsh hand; both of these characteristics increased with concentration of the alkali, and were very objectionable in the case of sodium sulfide. Alkaline fulling was slower than water fulling, but fulled pieces were not so wrinkled.

The fulling rate seems to be independent of soap titre within the range examined, but is dependent upon soap concentration. Soap fulled pieces had a limp, raggy character with good cover and an unctuous hand. Alkaline soap fulling appeared to be slower and produced a more threadbare, distinctly harsher felt than soap fulling, but all soap-fulled pieces ran very easily and were otherwise quite satisfactory.

The softeners encompass a variety of chemical classes but are similar in that all are fat derived and/or fat-like. The felts produced with these materials were generally wrinkle-free to a high degree. It was easy to select individual products of good performance. A number of these do not appear in this report either because they are mixtures or because the composition could not be determined. The texture of the fulled pieces was crisper than that of soap-filled pieces, but not objectionable. The felts had excellent fiber cover. Sulfonated tallow gave the softest hand, and was most soap-like.

Water, alkylolamide, and polyoxyethylene condensate felts were very prone to wrinkle and 'cement' during rapid felting. The felts were neither harsh nor soft.

A trial with the sodium salt of sulfonated toll oil produced a very tacky piece, and friction was so extreme that it became badly abraded and was torn out before 30 minutes fulling time.

The extremely rapid fulling rate experienced with thioglycollic acid is noteworthy. The fulled piece develops a very strong sulfur odor upon aging.*

* It was found possible to partially re-bond the reduced cystine linkage by using formaldehyde with the thioglycollic acid during fulling but the advantage of extremely rapid fulling was lost.

TABLE IV

FULLING PROPERTIES OF SELECTED COMBINATIONS

	Conc. on fabric weight (%)	Area Shrinkage (%) in minutes 15	30	45	60	Mean tensile strength in lbs. (dry)	Mean tensile strength in lbs. (wet)	Loss of strength when wet (%)	Fulling index*	Wrinkles and/or cemented folds
Sodium soap (25° titre)..	3	4	16	29	37	36.5	33.5	8	0.99	good
Alkylolamide condensate ..	2									
Sodium soap (25° titre)..	3	5	16	28	39	40	34.5	14	1.02	good
Poloxyethylene condensate.	2									
Quaternary fatty acid amide	3	8	24	38	46	51.5	45	13	1.12	fair
Alkylolamide condensate ..	2									
Quaternary fatty acid amide	3	18	37	43	51	61	53.5	12	1.19	fair
Polyoxyethylene condensate	2									
Sulfonated tallow 36%....	3	16	29	41	51	54.5	47	14	1.07	fair-poor
Alkylolamide condensate ..	2									
Sulfonated tallow 36%....	3	20	34	46	53	54	48.5	10	1.02	fair-poor
Polyoxyethylene condensate	2									

FULLING PROPERTIES OF ECONOMICAL COMBINATIONS WITH EXCELLENT DETERGENCY

Sodium soap (25° titre)..	3									
Alkylolamide condensate...	1	5	15	26	37	38.5	32.5	16	1.04	good
Sodium carbonate	2									
Sulfonated tallow (36%) ..	1									
Alkylolamide condensate...	1	21	38	49	54	62	49	21	1.15	poor
Sodium carbonate	2									
Sulfonated tallow (36%) ..	1									
Alkylaryl polyoxyethylene.	.5	4	14	27	37	41.5	33.5	19	1.12	good
Polyoxyethylene thioether..	.5									
Sodium chloride	5									

$$\text{Fulling index} = \frac{\text{Mean tensile strength (dry)}}{\text{Area shrinkage in 60 minutes}}$$

Several factors noticed during the runs such as foaming, tackiness, hard running, bad wrinkling, etc., would modify conclusions drawn from examination of the completed felt, but these do not essentially change conclusions as presented.

From Table III, it seemed that a combination of good fulling assistants with good detergents might prove a more satisfactory selection than any individual product. On the basis of this, three outstanding fulling agents (soap, a quaternary fatty acid amide, and sulfonated tallow) were tried with two outstanding detergents for mineral oil soil (a polyoxyethylene condensate, and an alkylolamide condensate). Workable and economical combinations resolve themselves to (a) soap, alkylolamine condensate and alkali*, (b) sulfonated tallow, alkylolamine condensate and alkali, and (c) sulfonated tallow, polyoxyethylene condensate and salt. Results appear in Table IV.

Combinations (a) and (c) appear to be satisfactory, but the rate of felting is slow; combination (b) produces rapid fulling, but the felt is wrinkled, contains cemented folds, and runs hard in the mill. All three produce compromise felts with no particular merits except that they are passable.

CONCLUSIONS

No product has been found which is ideal for both fulling and scouring; the outstanding individual product is sodium soap. Of the combination products, sulfonated tallow with a polyoxyethylene condensate is roughly equivalent to soap plus an alkylolamide condensate, both of which are superior as detergents. It is thus possible to full satisfactorily in neutral solution as well as in alkaline solution whenever this is desirable.

While soap is almost certainly not irreplaceable, no replacement has been found which shows unqualified superiority for both fulling and scouring.

* Note that sodium carbonate serves no useful purpose in fulling, but is included as a scouring assistant. No felt produced in an alkaline medium was selected for superior quality.

REFERENCES

(c) LaFleur, K. *Am. Dyestuff Reptr.* 39, 12 (1950).

(2) LaFleur, K. *Textile Research J.* 19, 8 (1949).

• PATENT DIGEST •

DYEING CELLULOSE ACETATE—Vat Dyes Reduced, Diacetone Alcohol Added. C 4, 07

U S Pat 2,524,072-73
(Celanese Corporation of America—Olpin, Stanley—Oct 3, 1950)

PAUL WENGRAF

These two patents refer to the dyeing of cellulose ester fibers with vat dyes.

U S Pat 2,524,072 suggests the reduction of the vat dye in a mixture of water with an organic base (preferably pyridine), simultaneously giving a basic reaction and a swelling effect on the fiber, and also generally containing diacetone alcohol. The fiber is immersed for a short time (e g, 5 minutes) in this liquid, rinsed and reoxidized.

U S Pat 2,524,703 discusses vat dyes reduced in the same manner except that the vat has to be prepared in aqueous solution as usual, whereupon diacetone alcohol is added as a swelling agent. Careful neutralizing with a weak acid such as boric or alpha-amino-aliphatic acids follows in order to obtain the free leuco-vat compound, and then finally padding, rinsing and reoxidizing as usual. According to the claims the pH has to be lower than 11.5 and the dissociation constant less than 10^{-5} (thus also comprising acetic acid —see examples 1 and 2).

Dyestuffs that can be applied in these processes are Caledon dyes of the anthraquinoid type (Jade Green, Olive Brilliant Blue 3 G, Red X 5 B, Dark Brown 6 R, etc). It should be emphasized that these extremely fast dyestuff types could not be used up to now for dyeing celulose acetate because of the strong amounts of alkalis required for vatting. Therefore, the present patents offer methods for applying a new series of valuable dyes on cellulose acetate.

EXPEDITED PATENT SERVICE

Patents listed in this issue, or any patent you may need, mailed within 24 hours of receipt of order, week ends and holidays excepted. Save 6 to 10 days with this special service to readers of AMERICAN DYESTUFF REPORTER. Patent number must be given, plus title or general subject. 50c per patent, 10c extra if wanted airmail. PATENT PROCUREMENT SERVICE, Box 4127 ADR, Washington 15, D. C.

References cited by the Patent Office, among others:

to U S Pat 2,524,072:

U S Pat 2,182,963 (1939—Celanese): application of a vat dye, vatted in an organic base in substantial absence of water. This vat is diluted with an organic liquid.

U S Pat 2,107,526 (1938—Dreyfus): padding cellulose acetate with a leuco-vat in aqueous or dilute solvent solution, partly evaporating the liquid and dyeing in an inert atmosphere to prevent premature reoxidizing. The concentrated solution is thereafter reoxidized on the fiber.

Brit P 479,867 (Dreyfus-Moncrieff): package dyeing cellulose acetate by circulating free leucovat or alkali salts thereof. The solution contains a nonalkaline, water soluble alcohol (methanol, ethanol, etc).

to U S Pat 2,524,073:

U S Pat 2,428,833 (1947— Celanese): impregnating cellulose acetate with an alcoholic (70 per cent) solution of a leuco-vat dye sulfuric acid ester (Indigosol) and reoxidizing as usual (cf *Am Dyestuff Reptr* 37, 397 (1948)).

U S Pat 2,107,526 (see above).

Brit P 592,858 (1947—United Turkey Red): dyeing cellulose acetate with dyes otherwise having no affinity to the fiber by using thiocyanate plus an organic swelling agent (e g, 25 per cent acetone or 16 per cent ethyl lactate or diacetone alcohol + 10 per cent ammonium thiocyanate).

Brit P 479,867 (see above).

U S Pat 2,524,092-93 (Celanese Corporation of America—Ward, Haggerty—Oct 3, 1950): vat dyeing of mixed fabrics composed of cellulose acetate and cellulosic or animal fibers according to similar principles. In U S Pat 2,524,092 the vat consists of the vatted dyestuff, thiocyanate and diacetone alcohol having a pH betwee 10.5-11.5. In U S Pat 2,524,093, the dyeing of fabrics containing cellulose acetate plus animal fibers from dyebaths at a pH 10.5-11.5 is described. Here the liquid contains the vatted dye, thiocyanate and diacetone alcohol.

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1951, American Association of Textile Chemists and Colorists

MARCH 5, 1951

CALENDAR

COUNCIL

April 20 (Raleigh, N. C.), June 15 (Hotel New Yorker, New York), October 18 (Hotel Statler, New York), November 16 (Hotel New Yorker, New York).

GENERAL RESEARCH COMMITTEE

April 20 (Raleigh, N. C.), June 15 (Hotel New Yorker, New York), October 18 (Hotel Statler, New York), November 16 (Hotel New Yorker, New York).

NATIONAL CONVENTIONS

1951: October 17-18-19, Statler, New York.
1952: Nov. 6-8, Boston.
1953: September 17-19, Hotel Stevens, Chicago.

HUDSON-MOHAWK SECTION

Meetings: March 16 (Albany), May 11 (Albany), June 22 (Annual Outing).

MIDWEST SECTION

Meetings: May 5 (Hotel Schroeder, Milwaukee), June 16 (Outing, Lake Lawn Lodge, Delavan, Wis.), September 29 (Morrison Hotel, Chicago).

NEW YORK SECTION

Meetings: March 9 (Hotel New Yorker), March 30 (Swiss Chalet), May 4 (Swiss Chalet), June 15 (Outing).

NORTHERN NEW ENGLAND SECTION

Meetings: March 9 (M I T, Cambridge), April 13 (L T I, Lowell), May 18 (Andover C C, Andover), October 26 (L T I, Lowell), November 30 (Boston, Annual Meeting).

Outing: June 8 (Merrimac V C C, Methuen).

PHILADELPHIA SECTION

Meetings: March 16, April 13, September 14, October 26, December 7, January 18, 1952 (all at Kugler's Restaurant, Philadelphia).

Outing: June 1 (Torresdale-Frankford Country Club).

RHODE ISLAND SECTION

Meetings: March 30 (Providence Engineering Society), April 27 (Wannamoisett Country Club), May 25 (Johnson's Grill), October 26 (Providence Engineering Society), November 16 (Johnson's Grill).

Outing: June 22 (Wannamoisett Country Club)

SOUTH CENTRAL SECTION

Meetings: May 12, December 1 (both in Hotel Patten). Summer Outing: August 24-25.

SOUTHEASTERN SECTION

Meetings: May 5 (Atlanta, Ga.), June 8-9 (Annual Outing, Radium Springs, Albany, Ga.), September 8 (Columbus, Ga.), December 8 (La Grange, Ga.).

WESTERN NEW ENGLAND SECTION

Meetings: March 16 (Danbury), May 4, June 22 (Outing).

OTHER EVENTS

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGISTS

Meetings: April 4, May 2, June 6, September 12, October 3, November 7, December 5 (Builders Club, New York).

AMERICAN CHEMICAL SOCIETY

Meetings: April 1-5 (Boston, Mass); April 8-12 (Cleveland, Ohio); September 3-7 (New York, N Y).

AMERICAN SOCIETY FOR TESTING MATERIALS

Committee D-13 on Textile Materials, March 14-16, New York.

Committee D-12 on Soaps and Other Detergents, March 19-20, New York.

Spring Meeting and Committee Week, March 5-9, Cincinnati, Ohio.

Annual Meeting, June 18-22, Atlantic City, N. J.

Spring Meeting and Committee Week, March 3-7, 1952, Cleveland, Ohio.

Annual Meeting, June 23-27, 1952, New York, N. Y. (The biennial Apparatus and Photographic Exhibits will be held in conjunction with this meeting).

NATIONAL ASSOCIATION OF TEXTILE MACHINERY MANUFACTURERS

Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall, Atlantic City, N. J.

NATIONAL OUTERWEAR AND HOSIERY ASSOCIATION

Knitting Arts Exposition, April 30-May 4, Atlantic City Auditorium.

TEXTILE RESEARCH INSTITUTE

Annual Meeting, Nov. 8-9.

Dr Weidmann to Speak at N Y Section Meeting

DR CHARLES WEIDMANN, technical director of Ciba Co, Montreal, will speak before the New York Section this Friday at the Hotel New Yorker on the molten metal continuous dyeing process developed in England by Standfast Dyers & Printers, Ltd. R S E Hannay, chairman of Standfast, is scheduled to be present. Dinner is set for 6:45.

ONE HUNDRED AND SEVENTY-FIFTH COUNCIL MEETING

THE Council held its 175th meeting in the Hotel Commodore, New York, N Y, on Friday morning, January 19, 1951. Present were President C Norris Rabold, presiding; J Robert Bonnar and George O Linberg, Vice-presidents; Leonard S Little, Chairman of the Research Committee; William H Cady, Carl Z Draves, Henry F Herrmann and P J Wood, Past Presidents; John M Gould, Edward M Lynch, Jr, and Frank J O'Neil representing Northern New England; Edward J Allard, Peter G Kolupaev and Alden D Nute representing Rhode Island; J Edward Lynn representing Western New England; Albert E Herrmann, Jr representing Hudson-Mohawk; Carl H Brubaker, Ralph M Fischer, Herman E Hager, Paul J Luck, Herman E Wilde and Henry L Young representing New York; James Dixon, Richard B Stehle, Frederick V Traut, Percival Theel, S Graeme Turnbull and Jackson A Woodruff representing Philadelphia; John B Neely and Linton C Reynolds representing Piedmont; C Russell Gill and A Kempton Haynes representing Southeastern; Glenn R Bellamy representing South Central; Kenneth H Barnard of the Convention Committee; William A Holst Jr of the Technical Program Committee; and Harold C Chapin, Secretary.

The Secretary's report of the 174th Council meeting and financial statement of January 10, and the Treasurer's report of January 11, were accepted. Receipts on account of the American Dyestuff Reporter Award fund were referred to the Appropriations Committee for investment.

The Election Tellers reported the Constitution amended in accordance with the two proposals on the ballot, C N Rabold elected President, and J R Bonnar and G O Linberg elected Vice-Presidents. To accord with the amended Constitution it was proposed that in Article III, Section 2, of the Bylaws, the words, "delegate his duties to either of the Vice Presidents," be changed by substituting "one" for "either"; and that to Article X there be added a Section 6, as follows—

"For the purposes of Article VI of the Constitution the four Regions shall be New England, comprising Northern New England, Rhode Island and Western New England Sections; Central Atlantic, comprising New York, Philadelphia and Hudson-Mohawk Sections; Southern, comprising Piedmont, South Central and Southeastern Sections; and Western, comprising Mid-West, Pacific Southwest and Pacific Northwest Sections. Until this Article of the Bylaws be amended, a newly organized Section shall be considered a part of that Region to which, as compared with other Regions, the largest number of Senior members belonged at time of organization of the new Section."

These proposals were referred to letter ballot of the Council with approval of the meeting.

Committees were appointed, or stand, as follows—

EXECUTIVE COMMITTEE ON RESEARCH

L S Little, *Chairman*

W D Appel — C N Rabold
J R Bonnar — H F Herrmann
J N Dalton — W M Scott
C W Dorn — J A Stevenson

PUBLICITY

G H Schuler, *Chairman*

Others to be appointed by Local Sections.

APPROPRIATIONS

W R Moorhouse, *Chairman*

H C Chapin — T R Smith
C Z Draves — P J Wood

PUBLICATIONS

P Theel, *Chairman*
W H Cady, *Editor*
Technical Manual & Year Book
H C Chapin
C Z Draves, *Editor, Proceedings*

R W Jacoby — P J Luck
H Y Jennings — C N Rabold
N A Johnson — G H Schuler

CORPORATE MEMBERSHIPS

G O Linberg, *Chairman*
G L Baxter, *Vice-Chairman*

E B Brearley — C R Gill
E S Chapin — F E Hilger
J Dixon — J J Marshall
C B Fieldhouse — R H Souther
H G Gendreau — H Whelchel
R P Wood

CONSTITUTION AND BYLAWS

H C Chapin, *Chairman*

C Z Draves — W A Holst, Jr

CONVENTIONS

K H Barnard, *Chairman*

C W Dorn — S L Hayes
W F Fancourt 3rd — G O Linberg
G H Wood, Jr

TECHNICAL PROGRAMS

W A Holst, Jr, *Chairman*

K H Barnard — H E Hager
H Boxser — V B Holland
M A Dahlen — R W Jacoby
F Dannerth — A D Nute
S J Davis — W G Parks
A W Etchells — S H Williams

INTERSECTIONAL CONTEST

F J O'Neil, *Chairman*

J R Bonnar — E D McLeod
J M Gould — T R Smith

COUNCIL MEETING DATES

R W Joerger, *Chairman*

J Dixon — A K Haynes

COLOUR INDEX

W H Cady, *Chairman & Coordinator*
E R Laughlin, *Secretary*

W D Appel — D P Knowland
J R Bonnar — W R Moorhouse
H M Chase — A Morrison
A F Clark — A L Peiker
J L Crist — R W Powell
R E Derby — C H A Schmitt
F R Haigh — T R Smith
W A Holst, Jr — B M Van Cleve
R W Jacoby — W von Bergen
P J Wood

STEERING COMMITTEE:

W H Cady, *Chairman*

W D Appel — R W Jacoby
J R Bonnar — E R Laughlin
W A Holst, Jr — A L Peiker

SUBCOMMITTEE ON CLASSIFICATION AND NUMBERING:

W H Cady, *Chairman*

J R Bonnar — R W Jacoby
W A Holst, Jr — E R Laughlin

SUBCOMMITTEE ON FASTNESS:

W H Cady, *Chairman*

H Christison — D P Knowland
L Fusser — R W Powell
A K Gyzander — C A Seibert

SUBCOMMITTEE ON PROPERTIES OTHER THAN FASTNESS:

W H Cady, *Chairman*

F Dexter — W A Holst, Jr
E C Hansen — C A Sylvester

SUBCOMMITTEE ON COORDINATION OF DATA:

G H Schuler, *Chairman*

L Fusser — E D Lind
W A Holst, Jr — A L Peiker
D P Knowland — C H A Schmitt

BIBLIOGRAPHY

W H Cady, *Chairman*

A G Bruinier, Jr — A R Macormac
T R Foltz, Jr — G J Mandikos
M S Furry — J F Oesterling
L Fusser — W H Peacock
R D Greene — E L Phelps
L V Hanley — J W Place, Jr
R W Joerger — F J Rizzo
C A Jones — G R Thompson
J H Kettering — F Tripp
P G Kolupaev — G F Walz
F T Lense, Jr — R K Worner
V I McLendon — A S Wrigley
P Walra·h

PRESIDENT'S ADVISORY COMMITTEE

J R Bonnar, *Chairman*

W D Appel — G O Linberg
H C Chapin — L S Little
H F Herrmann — W R Moorhouse
T R Smith

Entrance of Association employees under Federal Social Security law amendments effective January first was approved.

It was voted that members of the Association in the Armed Forces of the United States be invited to retain their listing as Association members without obligation other than the reporting of such service to the Secretary of the Association, that each of these members be entitled to subscribe to all publications mailed generally to members upon payment of $3.50 per annum in lieu of regular dues, and that no lapse in payment of dues concurrent with such service be recorded as indebtedness to the Association.

Representing the Publications Committee, Professor Theel reported a suggestion to be made to advertisers in the *Year Book* that they list there the addresses of their branch offices. In the *Reporter* an abstract, and if practicable a photograph of the author, would hereafter head each article. In accordance with the Bylaws, papers simply contributed, as well as those presented before meetings, would be welcome in the *Proceedings*. Two of the screening committee for the American Dyestuff Reporter Award had accepted appointment. On appointment of a third, the names would be published. A brief

catalog descriptive of technical supplies sold by or for the Association was to be published in the Reporter, and subsequently issued in the form of reprints. Work was proceeding on the Vat Dye monograph and on revision of *Analytical Methods*. The manuscript was almost complete for the pamphlet on dyehouse mathematics. Mr Cady stated that September 30 had been settled as the last date for acceptance of material for the new *Colour Index*. There were still details to be worked out on the contract.

Representing the Publicity Committee Mr Schuler reported a record number of news items in the year 1950, with noteworthy increase from local Sections.

Mr Little stated that Mr Bonnar, whom he was succeeding as Chairman, would remain a member of the Executive Committee on Research, and that Mr Appel also would become a member. For the help of Sectional research committees in organizing their membership, lists of interested members were being compiled from the results of the recent convention questionnaire.

Mr Barnard reminded the Council that a change in the Bylaws would be necessary at the time the new Convention Committee assumes actual management of conventions. The dates of the convention of 1953 in the Hotel Stevens, Chicago, will be September 17, 18 and 19. Mr Luck reported progress on plans for the convention of this year in New York, Mr Holst on the Technical Program, and Mr O'Neil on the Intersectional Contest.

Mr Linberg reported for the Committee on Corporate Membership, and on Membership and Local Sections.

The next meeting of the Council will be in Raleigh, N C, on April 20.

Elected to Corporate membership were Dexter Chemical Corporation and Premier Thread Co. Each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary.

Senior

H G Abadi
E W Aboumrad
R J Andres
W J Armell
D M Brown
L P Buseth
R G Butler
A Chevrette
S N Coggins
V R Cost
T H Flood
R J Fortune
R C Gallup
W H Hand
D C Heckman
J A Hicks
J Howarth
D Jones
R G Keppler
P Lamarche
H A Lamoureux
R S Leonard
A Liebman
H K Livingston
F E Lizer
R A Madaris
G McAllister
R C Medl
R W Nebel
C Pappas
R O Patton
J L Pierce
J L B Plante
G E Rammel
J G Ramos
W Rebhuhn
J I Robinson
M Rogoze
C W Rougeux
N J Ruberti
A M Rulison
H G Sandler
J C Schwarz
M Shibata
H B Smith
B R Solez
K W Sonntag
C Sustmann
L J Swain
F Tattersall
D B Thornton
F H Ulrich
H Wainwright
J W Walter
J E Werden
A C Wrotnowski
G Yamanaka
J B Young
J W Young

Junior

J H Blakely, Jr
J K Brown
W E Carpenter
D C Duggan
H Kuhl, Jr
F J Lachut
J Malenkos
J W Scully
C V Shelly
R Siev
G M Smith
C D Stump
W Techinkel

Associate

S R Black
R I Brown
A A Davidow
R Dunford
F Tosio
H L Gerstner
F C Harris
E F Johnson
S Kamiya
R M Lacy
E L McCleary
J M Mizoguchi
E Naegeli
N H Sobin
W R Watt
F Yamaguchi

Student

R G Adell
R R Alexander
J A Baird
W Baumann
E Bilsky
G S Bradley
E N Braun
T F Broadhurst, Jr
K D Brown
E Charves
A Chaufan
B C Combs
P A Cook
W P Creighton
L J Deshaies
W L Douglas
C R Faircloth
W H Floyd, Jr
A L Gagnon
T L Graves
C J Gray
A L Greenhall
H G Guay
W K Hammett
J I Heintzelman
E G Hochberg
W E Holt
H S Howell
A Hurvitz
I J Jaremko
M T Jockers
C C Jones, Jr
F E Larrison
G C Lindsey
H B Martin
A A Marquis
A M Maslia
J H McKenna
J M Mellion
R R Mercer, Jr
S M Meurin
H L Middleton
S F Miller
P Miok
C B Morris
R D Neal
R H Palmer
J J Pittman, Jr
J Price, Jr
W S Ramey
D H Ramsbottom
M Rosen
B Ross
J G Rothell
P S Rothholz
G I Scott
S Sevil
R W Singleton
A C Sirois
R A Stanziola
M C Stone, Jr
O Teszler
J S Thackrah
A F Turbak
R S Wasserstein
J C Webb
J L Williams, Jr
K W Winston, Jr
W C Wylie, Jr

Transferred from other classifications to Senior membership were:

J W Ames
A Born
J F Cairns
D Cimma
W C DeSieghardt
R A Farland
W E Fayssoux
H W Fritz
A O Prado de Mendonca
S R Tomko
W F Wigglesworth
H A Wolk

Respectfully submitted,

H C CHAPIN,
Secretary

SECRETARY'S FINANCIAL REPORT — JANUARY 10, 1951

	Applications	*Dues, Regular & Reinstate*	*Dues, Corporate & Sustaining*	*Miscellaneous*	*Totals*
Received and transmitted to Treasurer					
Aug 1 to Nov 3, 1950	$1,270.00	$16,922.00	$ 912.50	$ 5,968.21	$25,072.71
Nov 3, 1950 to Jan 10, 1951	1,026.00	15,072.00	32,260.00	5,168.59*	53,526.59
Totals in fiscal year to Jan 10	2,296.00	31,994.00	33,172.50	11,136.80	78,599.30
Leaving deposited by Treasured with Secretary					5,346.32
					*
Miscellaneous items					
Dividends					$ 560.15
Reporters & reprints					26.85
Year Books					445.90
Crockmeters					460.00
Crock cloth					296.25
Multifiber cloth					161.45
Moth cloth					182.00
Water test apparatus					165.25
Dyed standards					19.00
Knitted tubing					254.00
Gas fading units					67.10
Buttons					14.00
Color transfer charts					15.00
Flammability testers					2.00
Colour Index					60.00
Analytical Methods					300.50
Convention expense repayment					139.14
American Dyestuff Reporter award					2,000.00
					$5,168.59

ONE HUNDRED AND SIXTY-FIFTH GENERAL RESEARCH COMMITTEE MEETING

THE 165th meeting of the General Research Committee was held at the Hotel Commodore in New York, Friday, January 19, 1951.

L S Little, Chairman, called the meeting to order at 1:50 pm. He read letters from George Hart and Matthew M O'Brien. The latter is a representative of the rayon yarn producers and is planning to ask the Federal Trade Commission to hold a Trade Practice Conference among the producers of acetate and rayon fibers. In view of some confusion on terminology a great majority of the producers are now in favor of using the term "rayon" for regenerated cellulose fibers and the term "acetate" for fibers or filament made from cellulose acetate. This would eliminate the term "estron." We have been asked to express our approval of the purpose of the meeting and our support of the request to hold the conference.

Mr Little reported that the Executive Committee on Research is in agreement. There was considerable discussion of this proposal, some of those present questioning the fact that the matter is appropriate for AATCC action. Eventually, upon motion by Mr. Barnard, the meeting authorized the Chairman to write a letter favoring the proposal to hold the conference.

Mr Little stated that it is the intention to increase and improve the program and asked that members of the committee write him of any interest they have in the program. He referred to the fact that the Sectional Advisory Research Committees are not generally functioning with full effectiveness and asked the assistance of the members in stimulating the groups. He then referred to the fact that at this first meeting of the year we had a number of new chairmen of subcommittees due to the fact that some of the terms of office of the old chairmen have expired. The meeting was then turned over to Dr H W Stiegler.

Dr Stiegler stated that recent experience would indicate that the meetings of the General Research Committee may be able to start at 1:30 instead of 2 pm and it is the intention to change the time for the next meeting. He then made some general comments on the lack of understanding of the real purposes of the AATCC that appears to exist among some people in the trade in spite of all the attempts to publicize our research activities.

Mention was made of the fact that forms for the *Year Book* will close very shortly and that any appropriate actions of the Committee today will be in the new *Year Book*. He requested that complete data on the Committee personnel be forthcoming promptly so that it may be included. He also referred to attempts to formalize the style of describing procedures so that our practices will be in agreement with that of other associations. This will call for reciprocal activities with the other associations.

He referred to the fact that the following methods were approved during the past year:

Flammability and Wool Oils, in which cases the methods are set up but no classification for interpretation has been furnished.
Wash Fastness Test III-A
Durable Finishes

He referred to the fact that the following now have the status of Reference Committees:

Perspiration
Wool Detergency
Mildew
Analytical
Pilot Plant Equipment

Dr Stiegler then advised that the facilities at Lowell are getting some additional equipment after approval by the Executive Committee on Research: three small machine tools, Hunter small color difference meter, dash wheel, steam press, flammability tester and a new Photovolt. Our people at Lowell also have easy access to the General Electric Recording Spectrophotometer and to a Color-Eye instrument, as well as to Lowell Textile Institute's constant temperature humidity room and their other instruments. As a matter of information Mr Little inquired whether the members of the Committee recognized any serious deficiency in the equipment at our Lowell facilities. Apparently there were no deficiencies known to the members of the Committee.

Dr. Stiegler then stated that the wash fastness work was still going on, that the eight-inch Inconel tubes are freely available from Atlas Electric Devices, and that they are finding application for purposes other than making wash fastness tests. It was stated that Atlas Electric Devices will publicize the availability to all Launder-Ometer owners shortly and will also advertise the facts. It was also brought out that it is possible to run Inconel tubes in part of the apparatus and glass tubes in the remaining part at the same time. In referring to the work on the Accelerotor, Dr Stiegler pointed out that this instrument is not as yet on sale and we have no definite promise as to when it will be.

Lowell is doing some work on simplified control tests including spot tests and is still working with the Dynamic Dimensional Change Meter. Dr Stiegler then went on to the reports of subcommittees:

SUBCOMMITTEE ON WATER RESISTANCE—G A Slowinske, Chairman, reported that seven members were present at the meeting the day before and that Dr Ruby K Worner is a new member of the committee, replacing Dr Walter M Scott. The recent work of this committee has had to do with changes in the write-up of test methods. New drafts have been circulated to the members of the committee and 11 have approved with no comments while four have commented constructively. As a result slight revisions have been made. The order of presenting the five tests has been changed somewhat to the following:

1) Spray test
2) Immersion absorption test
3) Rain test
4) Impact penetration test
5) Hydrostatic pressure test

The titles have been changed to read "Resistance to Wetting" for the spray test and the immersion absorption test, and "Resistance to Penetration" for the rain, impact penetration and hydrostatic pressure tests. The scope of the tests has been reworded and enlarged and definitions of water repellency and water resistance have been approved. Mr Slowinske brought out the differences between the Official AATCC tests and the ASTM tests, and the fact that both organizations are getting closer together due to interlocking memberships on their respective committees handling this same type of work. Mr Little commented that the Federal Trade Commission industry hearing is due to come up in Washington in a month or two. Mr Bonnar inquired whether the fact that there are different tests appearing in ASTM than in AATCC indicated differences of opinion or whether there is general agreement. Mr. Slowinske stated that AATCC should consider seriously the dynamic absorption test, which we do not now have in our list of tests but is in the ASTM tests. Mr Dalton expressed the opinion that our definitions should be brought to the attention of the Federal Trade Commission.

SUBCOMMITTEE ON SMALL COLOR DIFFERENCES—F J O'Neil, Chairman, reported that the committee is definitely of the opinion that Acro glasses are not particularly applicable to our purposes since over 50% of the differences, which we consider, are changes in hue rather than merely changes in depth of shade. His committee is still considering the use of Munsell chips and because of glare believe they must specify the illumination and the general viewing conditions. While they are still hoping to find a simple optical device which is cheap, there appears to be no immediate candidate. Fluorescence has also been a problem for their consideration as fading degradation products appear to increase fluorescence. Another of their problems has been the preservation of samples since relatively long times may intervene between comparisons. Mr O'Neil also referred to cooperative work with Mr Seibert on attempting to develop a simple formula for evaluating fading tests.

SUBCOMMITTEE ON FASTNESS TO WATER—M J Babey reported that they are using the following solutions for test:

1) Distilled or deionized water
2) Sea water—a solution of
   3% sodium chloride
   0.5% magnesium chloride
3) Chlorinated pool water—containing 5 parts per million available chlorine

To determine fastness to any of these three types of water the new Perspir-Ometer is used. A tentative procedure has been adopted and will appear in the forthcoming *Year Book* as a tentative test. There was considerable discussion of the tentative test as read by Mr. Babey after which the meeting accepted it by vote. For the information of the Committee Chairman there was some discussion by Messrs Hirst and Holst.

SUBCOMMITTEE ON SIMPLIFIED WET CONTROL TESTS—Dr T G Hawley, Jr stated the problem of this committee as they had analyzed it. They are not looking for extreme accuracy but they are looking for simple tests of such a nature that, if possible, one test will tend to cover more than one fastness property. They are of the opinion, for example, that a single test may well combine wash fastness and shrinkage and have had some indications of success with this particular problem, particularly so far as cotton is concerned, and also so far as indicating that some fabrics will not stand washing at all, which can be demonstrated in a simple test and not require the longer, more formal standard test. They are investigating methods which require very little in the way of equipment so that the test might be set up almost any place. As they develop these tests they will have them checked in various laboratories represented on the committee and report progress at future meetings.

SUBCOMMITTEE ON LIGHT FASTNESS—C A Seibert gave a progress report on the work which he has conducted during the last two months on his carbon arc lamp study. He has not as yet arrived at conclusions which call for action by this Committee.

SUBCOMMITTEE ON WASH FASTNESS—C A Sylvester, Chairman, reported that interlaboratory work is now going on, evaluating a number of fabrics. Results will be compared with Munsell chips to determine the effect of the tests and measure the suitability of the chips for such evaluation. He also reported that his committee is recommending the elimination from the forthcoming *Year Book* of certain wash tests. It is the opinion of his committee that the cotton and linen tests for washing will suffice to cover manufactured organic fibers, and they, therefore, propose to leave separate tests for these organic fibers out of the book. Mr Sylvester pointed out that we would then be in agreement with CS-59. There was some discussion of this move, after which Mr Sylvester moved that the General Research Committee permit the tests for manufactured organic fibers to be deleted from the *1951 Year Book* and include the present wash tests under the heading of "Cotton, Linen and Manufactured Organic Fibers." The motion carried.

SUBCOMMITTEE ON SNAG RESISTANCE—Dr J E Smith, retiring Chairman of this committee, announced that it had chosen as its new Chairman, Cameron Baker. Dr Smith then pointed out that the sandpaper method for evaluating snag resistance of ladies nylon hosiery is now a tentative standard with the ASTM. The committee continues to study the sandpaper method and the snag pull method. They have decided not to carry out further work with the NAHM snag tester but are intending to give further study to the U S Testing Company's snag tester. Further work for the committee was lined up for the next few months.

SUBCOMMITTEE ON FIRE RESISTANCE—J R Redmond, Chairman, reported that there have been no objections to the range of char length limits proposed in his committee report in the *1950 Year Book*. This then is a candidate for Official Standard for the *1951 Year Book*. His committee continues to study treatments, equipment details, including sample holders and their cooperation with the ASTM corresponding committee.

There being no further new business the meeting adjourned at 4:10 pm.

Those present were:

L S Little, *Chairman*
H W Stiegler, *Research Director*
G H Schuler, *Secretary*

E C Atwell	J B Neely
M J Babey	J E Norton
K H Barnard	A D Nute
J R Bonnar	F J O'Neil
W H Cady	C N Rabold
H C Chapin	J R Redmond
M A Dahlen	E W K Schwarz
J N Dalton	C A Seibert
C Z Draves	J H Skinkle
J M Gould	G A Slowinske
H E Hager	J E Smith
H C Haller	R B Smith
T G Hawley, Jr	R B Stehle
A K Haynes	J A Stevenson
A E Hirst	C A Sylvester
W A Holst	P Theel
N A Johnson	F V Traut
A J Kellner	F R Tripp
P G Kolupaev	S G Turnbull, Jr
E M Lynch, Jr	H E Wilde
A R Macormac	P J Wood
O F Marks	J A Woodruff
W R Moorhouse	G M Wyman

H L Young

Synthetics Group—

ODOR PREVENTION IN RESIN TREATED FABRICS*

L A FLUCK, G J KEPPLER and T F COOKE, C L ZIMMERMAN

Textile Resin Application Laboratory *Application Research Department*

American Cyanamid Company

Textiles that have been treated with thermosetting aminoplasts, such as urea- and melamine-formaldehyde resins, develop unpleasant odors under certain conditions. A mechanism for the formation of odor in fabrics that have been treated with these nitrogen-containing resins has been proposed. This mechanism suggests that the development of odor is due to the formation of amines. These amines can be formed by (1) a reaction between the ammonium ion of ammonium salt catalysts and formaldehyde liberated from the resins during curing, (2) a reaction between the ammonia liberated from either ammonium salt or nonammoniacal-nitrogen-containing catalysts and formaldehyde, or (3) decomposition of the nonammoniacal-nitrogen-containing catalysts into odor-producing amines. The addition of a formaldehyde acceptor, such as urea, to the resin bath was found to prevent odor formation in the treated fabrics. A sensitive, reproducible odor test for resin-treated fabrics was developed.

INTRODUCTION

THE thermosetting aminoplasts, such as urea- and melamine-formaldehyde resins, impart to fabrics durable properties, such as shrinkage control, crease resistance and full hand. These resins also have many desirable properties including water solubility, ease of application and low cost. For these reasons they have become firmly established in the trade for finishing fabrics. Fabrics treated with these resins have, however, the defect of developing unpleasant odors under certain conditions. These odors have been described as fishy, rancid, glue-like or just unpleasant. The development of the odor usually occurs in the summertime during hot, humid weather. After months of manufacturing fabrics that were completely odor-free, it has been very disconcerting for a manufacturer to start producing fabrics that developed odor for no apparent reason. Samples of fabrics that smelled badly on certain days often had little or no odor on other days. The problem of preventing odor formation was made difficult by the absence of a reliable odor test. To add to the difficulty of studying the odor problem, it was not possible in the laboratory consistently to produce fabrics with odor. Thus, there has been a pressing need for an understanding of how the odors are formed and for an inexpensive, reliable method of preventing them.

One of the generally accepted hypotheses advanced to explain the development of odor was the formation of amines from the thermal decomposition of the nitrogen-containing resins during the high-temperature curing operation. Since the obnoxious odors of most amines in very small quantities are well known and since the description of amine odors usually fits well those obtained from resin treated fabrics, this hypothesis seemed to offer a reasonable explanation. The investigation reported herein has led to a different hypothesis, which in turn has suggested methods of preventing odor formation that have appeared to be successful.

ODOR—Many theories have been advanced for the detection of odor by the scent organs *(2)*. One of these theories postulates that some kind of chemical action takes place between the odor-producing gas and a component in the nasal sensory area. Another theory claims that odoriferous molecules absorb infrared rays from the body, producing temperature changes detected by the nerves of the nose. One of the most recently developed theories states that odor-bearing molecules contacting the protein molecules of the nasal membrane disturb the electrical orientation of the protein molecules, which in turn starts an "action current," which is relayed to the brain.

Unfortunately, no universal odor-measuring device has been developed. In the field of color, an instrument called the spectrophotometer has been developed for numerically measuring color. Even with this instrument, however, small color differences can be observed more accurately with the eye than with the complex, precision-built spectrophotometer and integrator. However, the nose for odors, like the eye for color, is a very accurate detector, capable of recognizing hundreds of thousands of different odors. The nose is convenient to use, very sensitive to most odors and its findings generally can be duplicated by the same or other persons. It is interesting to note that data have been published *(6, 7)* showing that the human nose can detect less than one part per trillion of some mercaptans, synthetic musk, pyridine, etc. As can be seen from these data, the nose is extremely sensitive for detecting small quantities of some odors.

In the work described herein, the nose was used to detect odors. Fairly reliable methods of testing odor in resin-treated fabrics were developed, as described in a later section of this article. These tests were essential for the subsequent study of the mechanism and prevention of odor development.

MECHANISM OF ODOR FORMATION

The first step in the investigation of methods of preventing odor development in resin-treated fabrics was a study of the chemistry of possible odor-producing materials. It was known from early experiments that odors coming from cured, resin-treated cloth are fish-like and become more intense if the cloth is made alkaline, but disappear after an alkaline washing. These facts suggested the presence of amines as the odorous material. It is known that methyl amines, which have a strong fish-like odor, can be formed by a reaction between ammonium salts and formaldehyde *(3, 9)*. Since ammonium salts are frequently used to accelerate the polymerization of resins and since formaldehyde, methyl alcohol, ammonia and hexamethylene tetramine are all possible reaction products of the curing process, methyl amines could be formed. The following reactions in which NH_4Cl is used as the accelerator illustrate this point:

A 1) $2\,NH_4Cl + 3\,HCHO/aq \rightarrow 2\,CH_3NH_2.HCl + CO_2 + H_2O$

2) $2\,NH_4Cl + 6\,HCHO/aq \rightarrow 2\,(CH_3)_2NH.HCl + 2\,CO_2 + 2\,H_2O$

* Presented at the Twenty-ninth Annual Meeting in Portsmouth, N H on Sept 30, 1950 by L A Fluck.

3) $2\,NH_4Cl + 9\,HCHO/aq \rightarrow 2\,(CH_3)_3N.HCl + 3\,CO_2 + 3\,H_2O$

4) $3\,HCHO + 2\,CH_3NH_2/aq \rightarrow 2\,(CH_3)_2NH + CO_2 + H_2O$

5) $3\,HCHO + 2\,(CH_3)_2NH/aq \rightarrow 2\,(CH_3)_3N + CO_2 + H_2O$

B 1) $NH_4Cl + 2\,HCHO \rightarrow CH_3NH_2.HCl + HCOOH$

2) $NH_3 + HCOOH \rightarrow HCOONH_4$

3) $HCHO + HCOONH_4 \rightarrow CH_3NH_2 + CO_2 + H_2O$

C 1) $CH_3OH + NH_3/\text{catalysis} \rightarrow CH_3NH_2 + H_2O$

2) $CH_3OH + CH_3NH_2/\text{catalysis} \rightarrow (CH_3)_2NH + H_2O$

3) $CH_3OH + (CH_3)_2NH/\text{catalysis} \rightarrow (CH_3)_3N + H_2O$

D 1) $6\,HCHO + 4\,NH_3 \rightarrow (CH_2)_6N_4 + 6H_2O$

2) $(CH_2)_6N_4 + HCl + 4\,H_2O \rightarrow 4\,CH_3NH_2.HCl + 2\,CO_2$

In order to show in the laboratory that odors could be produced on cloth by the above reactions, a piece of cotton cloth was padded with a solution containing ammonium sulfate, formaldehyde and hexamethylene tetramine with no resin present. The padded cloth was dried and then baked for five minutes at 300°F. No odor was apparent immediately, but upon standing overnight in an atmosphere of 65% relative humidity at 70°F, a fishy odor could be detected. The addition of sodium formate to the padding solution greatly increased the amount of odor. These experiments showed that the fishy odor could be produced on cloth in the absence of resin by a reaction between formaldehyde and ammonium salts or other materials that might be present during the resin-curing cycle.

In addition to ammonium salt catalysts, such as ammonium sulfate and diammonium phosphate, textile resin baths frequently contain ammonium hydroxide, which is added to keep the impregnating solution alkaline and thus prevent premature polymerization of the resin. It is well known that formaldehyde is released from melamine- and urea-formaldehyde resins during drying and curing. In many resins there is also free formaldehyde in the material as sold. Formaldehyde is not given up from a water solution very readily, especially when the solution is heated in a humid atmosphere. Thus, humid drying conditions, which have been shown in practice to promote odor, tend to keep higher concentrations of formaldehyde in contact with the goods (and ammonium salts) for a longer period of time.

The methyl amines have a fish-like odor; trimethyl amine has a more fish-like odor than dimethyl amine while monomethyl amine has an odor more like ammonia. The longer the time available for reaction between formaldehyde and ammonium salts, especially at higher temperatures, the more trimethyl amine is formed. Thus, any of the following factors would be expected to contribute to odor formation: 1) drying in an atmosphere that is too humid; 2) curing for too long a time; 3) curing at a temperature that is too high; 4) failing to give an alkaline wash after curing to promote volatilization of the free amine from the cloth.

Even though the above equations show that usually the odorless amine acid salts would be produced, the free amine may be released from the acid slowly in humid conditions and absorbed by the fabric or given off to the air. Certainly the odor is potentially there, to be released when the proper conditions are encountered.

ODOR PREVENTION

There seemed to be two ways to attack the problem of odor prevention: 1) the use of a formaldehyde acceptor, i.e., a compound that would react with formaldehyde at a much faster rate than ammonium compounds and thus tie up the formaldehyde before it had an opportunity to form an amine; and 2) the use of a nonammonium salt catalyst or accelerator.

The use of a formaldehyde acceptor was considered logical since laboratory experiments showed that fishy odor was not produced when Aerotex Resin M-3, a methylated melamine-formaldehyde resin, was applied to wool with diammonium phosphate as the catalyst under extreme curing conditions, whereas, a fishy odor was obtained when the resin was applied to cotton or rayon and cured under the same extreme conditions. The reaction between wool and formaldehyde is well known (*1, 4, 5, 8*). It would appear probable from these experiments that any formaldehyde present interacted with the wool before it could react with the diammonium phosphate to produce odor. Many compounds react with formaldehyde, but to be useful in odor prevention with textile resins, the compound should be colorless, odorless, nontoxic and not damage the textile fibers or affect the desirable properties of the resin finish. In addition to these requirements, it must be compatible with the resin system and not adversely affect the curing. Of all the formaldehyde acceptors considered, urea (Aerotex Buffer 190-A) seemed to fit these qualifications best. It is also relatively inexpensive. A series of experiments were made, therefore, to show the effect of urea upon various resins and resin combinations. More recent work has shown that dicyandiamide (Aerotex Buffer DCY) is much more effective in preventing formation of odor both from a standpoint of quantity and cost.

All the odor tests in the following experiments were carried out with resin-treated fabric, which had been cured but not washed since the prime purpose was an attempt to eliminate completely the formation of fish odors. Washing of fabric containing fish odors removes them to a degree dependent on the components of the finish, the amount of odor present, and the efficiency of the wash. Plant washing after curing is normally recommended to remove poorly adherent resin, formaldehyde odors, and accelerator residues as well as fishy odors.

PERMEL RESIN—A cotton fabric was padded with a bath containing varying amounts of urea and Permel Resin, which contains a melamine formaldehyde resin. Ammonium sulfate was used as the catalyst. These pieces were dried and then cured for 4.5 minutes at 300°F and 2.5 minutes at 350°F. Table I shows that the addition of urea to a Permel Resin bath tends to prevent odor formation, especially if the resin is cured at a fairly low temperature. Table I also shows that the addition of urea in the proportions used has no adverse effect upon the properties imparted by the resin to the fabric. The stability of the baths containing urea was equal to those containing no urea. On the basis of these experiments, it appeared that 10% urea, based on Permel Resin, or 20% urea, based on Permel Resin solids, should be used in Permel Resin baths to protect against odor formation under a wide variation in application conditions. Further tests show that the addition of this amount of urea will also prevent odor formation in mixtures of Permel Resin and Aerotex Cream 450 without affecting any of the resin properties on the fabric.

AEROTEX RESIN M-3—A cotton fabric was padded with a solution containing Aerotex Resin M-3 and various amounts of urea. Aerotex Accelerator 187, an ammonia-salt type, was used. Half of the cloth was cured for 4.5 min at 300°F and the remainder for 2.5 min at 350°F. Table II shows that no odor was obtained when as little as 5 per cent urea, based on resin solids, was added to the pad bath. The table also shows that the addition of this amount of urea did not adversely affect the tensile strength, shrinkage or crease resistance of the treated fabric. Mixtures of Aerotex Resin M-3 with Aerotex Resin 160, a thermoplastic-resin emulsion, require 10 per cent urea, based on resin solids, for odor prevention as shown in Table III. It is believed that the addition

TABLE I
EFFECT OF UREA ADDITIONS TO PERMEL RESIN BATHS

% Urea (based on Permel Resin Solids)*	Odor Test—Unwashed Cotton Fabric				AATCC Spray Test: Initial					
							After 3 Washes		After 3 Dry Cleanings	
	Cured 2.5 min @ 300°F	Cured 4.5 min @ 300°F	Cured 1 min @ 350°F	Cured 2.5 min @ 350°F	4.5 min @ 300°F	1 min @ 350°F	4.5 min @ 300°F	1 min @ 350°F	4.5 min @ 300°F	1 min @ 350°F
0	Fish	Fish	Fish	Fish	90	100	80	80	80	70
10	None	None	Fish	Fish	90	90	70	80	80	70
20	None	None	None	None	100	90	80	80	80	80
% Urea (based on Permel Resin Solids)**										
0	—	None	—	Fish	90	—	80	—	80	—
10	—	None	—	None	90	—	80	—	80	—
20	—	None	—	None	90	—	80	—	80	—

* Original bath containing 5% solids Permel Resin
** Original bath containing 5% solids Permel Resin and 7.5% solids Aerotex Cream 450

of a thermoplastic resin contributes to formation of greater amounts of odor by acting as an absorbent for the amines produced or the reactants producing them, thereby preventing volatilization from the cloth. Thus, it is extremely important to use urea in mixtures of this type.

AEROTEX CREAM 450—Although reports had been received that several mills had occasionally obtained objectionable odors from fabrics treated with urea-formaldehyde resins, it was very difficult to produce these odors in the laboratory under normal curing conditions. It was found, however, that odor could be produced when cotton or rayon cloth was treated with Aerotex Cream 450, a urea-formaldehyde resin, and cured at a high temperature for an excessive length of time if any of the following conditions existed:

a) Ammonium hydroxide was added to bath.

b) Formates were added to bath.

c) An aged lot of resin was used.

Ammonium hydroxide is frequently added to impregnating baths to adjust the pH in order to prevent premature polymerization. Table IV shows that the addition of ammonium hydroxide to the resin bath causes odor even if the resin is cured at 300°F. It is recommended that a base such as triethanolamine be used in raising the pH of urea-resin baths since it has less tendency to produce fish odors.

It has been observed that the presence of formates in the resin bath accelerates odor formation. In Table V the addition of formates to an Aerotex Cream 450 bath invariably caused odor to be formed in the cured fabric. This formation of odor with fo. mates has also been shown to be true with other urea resins as well as with melamine resins. Therefore, wax-aluminum salt water repellents, gas-fading agents or other materials containing formic acid or its salts should never be applied with a formaldehyde resin.

Fresh urea-formaldehyde concentrates may contain a slight amount of unreacted urea, which might be sufficient to prevent odor formation. If the resin precondensate has aged sufficiently, however, this free urea may have been consumed through reaction with formaldehyde; thus, the resulting product would be more apt to produce odor. Table VI shows the effect of aging of the resin at room temperature on odor development. It should be noted that another series run in the same manner starting with fresh material did not give odor with either the refrigerated sample or with the material aged at room temperature for a total of 10 weeks, at which time

TABLE II
EFFECT OF ADDITION OF UREA TO AEROTEX RESIN M-3

% Aerotex Resin M-3 Resin Solids*	% Urea Based on Resin Solids	Curing: Temp °F	Curing: Time Min	Odor Test	Grab Tensile Strength (lb): Warp	Grab Tensile Strength (lb): Filling	Shrinkage After One Sanforize Wash (%): Warp	Shrinkage After One Sanforize Wash (%): Filling	TBL Crease Resistance (cm) Before Washing: Warp	TBL Crease Resistance (cm) Before Washing: Filling
0	0	—	—	None	46	32	5.5	2.0	2.0	1.7
10	0	4.5	300	Fish	34	26	0.5	0.5	2.9	2.8
10	0	2.5	350	Fish	32	17	0.5	0.5	3.3	3.2
10	5	4.5	300	None	33	26	0.0	1.0	2.9	2.7
10	5	2.5	350	None	33	22	0.0	0.5	3.2	3.0
10	10	4.5	300	None	38	20	0.5	0.5	2.9	2.6
10	10	2.5	350	None	32	23	0.0	0.5	3.0	2.4

* Aerotex Accelerator 187 (3.5% on resin solids) used in bath.

TABLE III
EFFECT OF UREA ADDITIONS TO BATHS CONTAINING AEROTEX RESIN M-3 WITH AEROTEX RESIN 160

% Urea Based on Melamine Resin Solids*	Cure Cycle: Time Min	Cure Cycle: Temp °F	Odor Test	Grab Tensile Strength (lb): Warp	Grab Tensile Strength (lb): Filling	Shrinkage After One Sanforize Wash (%): Warp	Shrinkage After One Sanforize Wash (%): Filling	Total (warp plus filling) Curley Stiffness (mg): Before Wash	Total (warp plus filling) Curley Stiffness (mg): After One Wash
Untreated	—	—	None	46	32	5.5	2.0	5	—
0	4.5	300	Fish	42	25	0.5	0.0	61	43
0	2.5	350	Fish	38	30	0.0	1.0	70	57
5	4.5	300	None	41	28	1.0	0.0	64	47
5	2.5	350	Fish	40	31	0.0	0.5	62	53
10	4.5	300	None	46	32	0.5	1.0	58	46
10	2.5	350	Trace	44	40	0.5	1.0	63	54
20	4.5	300	None	47	35	0.5	1.0	64	48
20	2.5	350	None	48	34	1.0	0.5	72	54

* Original bath contained 7% Aerotex Resin M-3 solids, 5% Aerotex Resin 160 solids, and 3½% Aerotex Accelerator 187 on Aerotex Resin M-3 solids.

TABLE IV

EFFECT OF ADDING ALKALINE MATERIAL TO A BATH OF AEROTEX CREAM 450

	Ammonium Hydroxide Added to Bath			*Triethanolamine Added to Bath*		
		Odor Test			*Odor Test*	
*Conc of Alkali in Bath %**	*Bath pH*	*Cured 4.5' @ 300° F*	*Cured 9' @ 300° F*	*Bath pH*	*Cured 4.5' @ 300° F*	*Cured 9' @ 300° F*
0	7.0	None	None	7.0	None	None
0.1	7.3	None	None	7.0	None	None
0.25	7.6	None	Fish	7.3	None	None
0.5	8.6	None	Fish	7.8	None	None
1.0	9.3	Trace	Fish	8.1	None	Fish

* Original bath contained 20% Aerotex Cream 450 solids and 3½% Aerotex Accelerator 187 on resin solids.

the experiment was stopped. Experiments in which fresh Aerotex Cream 450 was dissolved by heating at varying high temperatures did not produce fish odors.

The addition of urea to a bath of Aerotex Cream 450 was found to interfere with crease resistance and durability when more than 2½ per cent based on the resin solids was used. This amount, however, did eliminate fish odor even when excessive curing conditions were used and when ammonia was present in the bath.

AEROTEX SYRUP 250 CONC—Another type of urea-formaldehyde resin is Aerotex Syrup 250 Conc. This material as applied has a higher degree of polymerization than the urea-formaldehyde resin, Aerotex Cream 450, used for producing crease resistance. Its formaldehyde content is also higher, and it is therefore more apt to produce fish odor because it has a lower ratio of urea to formaldehyde. The results in Table VII show that the addition of urea in an amount equal to 10 per cent of the weight of Aerotex Syrup 250 Conc solids prevents the production of fish odor even when the goods are given an excessive curing. If ammonia is present in the bath, the production of fish odor can also be prevented by the addition of urea, but the goods so treated may have a somewhat sour odor.

TABLE V

EFFECT OF ADDING FORMATE SALTS TO A BATH OF AEROTEX CREAM 450

		Odor After Curing				
*% Additive**	*3' @ 350° F*	*4.5' @ 300° F*	*3' @ 300° F*	*3.5' @ 300° F*	*1' @ 350° F*
No additive	None	None	—	—	—
2 Ammonium formate	Fish	Fish	—	—	—
1 Ammonium formate	Fish	Fish	—	—	—
2 Barium formate	Fish	Fish	—	—	—
1 Barium formate	Fish	Fish	—	—	—
2 Calcium formate	Fish	Fish	—	—	—
1 Calcium formate	Fish	Fish	—	—	—
2 Potassium formate	Fish	Fish	—	—	—
1 Potassium formate	Fish	Fish	—	—	—
0.2 Triethanolamine formate	None	None	—	None	None
1 Triethanolamine formate	Trace	Trace	—	Trace	Trace
2 Triethanolamine formate	Fish	Fish	—	Fish	Fish
Sodium formate	Fish	—	Fish	—	—
Ammonium sulfate	None	—	None	—	—

* Original bath contained 20% Aerotex Cream 450 solids and 3½% Aerotex Accelerator 187 on resin solids.

TABLE VI

EFFECT OF AGING AEROTEX CREAM 450 ON ODOR DEVELOPMENT

		Odor After Curing		*Total Age of Batch (Months)*
*Time of Aging**	*Temp of Aging*	*3' @ 350° F*	*3' @ 300° F*	
One week	Room	Fish	None	8
One week	45° F	None	None	8
**Two weeks	Room	Fish	None	8¼
Two weeks	45° F	None	None	8¼
**One month	Room	Fish	Trace	9
One month	45° F	None	None	9

* Bath contained 20% Aerotex Cream 450 solids and 3¼% Aerotex Accelerator 187 on resin solids. This lot of Aerotex Cream 450 was stored in a refrigerator for 8 months before this test was started.
** These resin baths did not give clear solutions when cooled and normally would not have been used.

NONAMMONIACAL CATALYST—In all the work carried out up to this point in the investigation, conventional ammonium salt catalysts were used. An example of an organic nonammoniacal catalyst is Aerotex Accelerator UTX. A comparison of this catalyst with Aerotex Accelerator 187 shows the organic type to have much greater resistance to fish-odor development. However, under excessive curing conditions a trace of fish odor was produced. Since the known organic accelerators contain nitrogen, it is possible that the odors are produced under excessive curing conditions by thermal decomposition to give fishy-smelling amines or by liberation of ammonia, which can produce the amines by reaction with formaldehyde. Table VIII gives some results obtained with these two types of accelerators.

EFFECT OF STORAGE AT ROOM TEMPERATURE ON UNWASHED RESIN-TREATED FABRICS—All the experiments described so far were carried out by testing samples within a matter of a few days after curing and showed that the addition of urea greatly reduced the production of fish odor with nitrogen-containing formaldehyde resins. It was desirable to determine if urea would control the development of fish odor in the treated fabric over an extended aging period at room temperature. Accordingly, a number of unwashed samples from the experiments previously described were sealed in cellophane and stored at room temperature for varying lengths of time. A summary of these experiments, which is given in Table IX, indicates that the effectiveness of urea is not lost through long storage at room temperature. It also shows that unwashed samples of fabric treated with a urea-formaldehyde resin and a nonammoniacal catalyst, which did not have odor when tested within a day or two after the cure, did develop a detectable fish odor after 6 or 8 months' storage at room temperature.

After being aged 8 months, unwashed samples treated with Permel Resin but no urea retained their original fish odor. All the samples containing 20% urea, based on Permel Resin solids, which had no fish odor initially even though cured for 2½ minutes at 350°F, still had no fish odor through the 8 months' aging period.

Unwashed samples of cloth treated with Aerotex Resin M-3 and urea had no odor either initially or after 7 months' aging. After 7 months' aging the samples of cloth treated with a mixture of Aerotex Resin M-3 and 160 and with Aerotex Accelerator 187 but no urea retained their fish odor; the samples cured at 350°F

TABLE VII

ODOR DEVELOPMENT WITH AEROTEX SYRUP 250 CONC

% Urea (based on resin solids)*	% NH_4OH (conc 28%)	Odor Test: Cured 4.5 Min @ 300° F	Odor Test: Cured 2.5 Min @ 350° F	Shrinkage (%) After One Sanforize Wash Cured @ 300° F: Warp	Shrinkage (%) After One Sanforize Wash Cured @ 300° F: Fill
0	0	Fish	Fish	0	1
0	0.8	Fish	Fish	½	1½
5	0	Trace	Fish	0	1
5	0.8	Sour	Sour	1	1½
10	0	None	None	0	1
10	0.8	Sour	Sour	1	1½

* Original bath contained 10% Aerotex Syrup 250 Conc solids plus 3½% Aerotex Accelerator 187 on resin solids.

and containing 5 and 10% urea lost their fish odor through aging, and the remainder of the samples containing urea developed no odor.

After 7 months' aging all samples treated with a combination of Aerotex Resin M-3 and Aerotex Resin 160 and with a nonammoniacal accelerator and no urea either retained their original fish odor or developed fish odor. These experiments indicated that the use of these accelerators is not a complete safeguard against odor development in unwashed fabrics. The samples containing these accelerators and urea, which had no fish odor originally, did not develop fish odor during the 7 months' aging period. None of the samples treated with Aerotex Cream 450 and stored had any fish odor originally and did not develop any after 2 months' aging.

From the foregoing experiments on unwashed resin treated fabrics, the following general conclusions can be drawn: 1) Resin treated samples cured at 350°F without urea retained their odor through aging. Samples similarly treated but cured at 300°F lost their fish odor during aging. 2) Resin treated samples treated with a bath that contained urea did not develop a fish odor through aging even when cured for an excessive time at 300°F or 350°F. 3) Samples of fabric treated with various resins and with Aerotex Accelerator UTX developed fish odor on aging even though no fish odor was detectable immediately after treatment. These results indicate the need for the addition of urea to such a bath even though a negative odor test is obtained on the freshly treated samples.

TESTING FOR ODOR

When the study of the odor problem was initiated, the lack of a reproducible, sensitive test for odor in a fabric was a severe handicap. Therefore, one of the first tasks undertaken was the development of such a test.

The first and most sensitive odor test developed is called the *"hand* odor test." This test consists of rubbing a moist 7"-square of fabric thoroughly with the hands and then smelling the hands continuously as they dry in the air. The amount of water used to moisten the fabric is just enough to wet it thoroughly without saturating it. The water is kneaded into the fabric by vigorously rubbing the fabric between the palms of the hands. As the hands approach the point of dryness and for a short time thereafter, any fishy odor present in the cloth will be easily detected on the hands. Although this test does not sound very scientific, it has been found to be reproducible and sensitive. It involves extraction from the fabric of water-soluble, odorous materials and maintenance of them at a temperature of approximately 98°F (body temperature) under conditions of high humidity. Odor from odor-containing resin-treated fabrics was detected consistently with the hand odor test, even though smelling the same fabrics exposed to high-temperature and humidity conditions 1) in sealed bottles, 2) in the air and 3) on a steam press, respectively, failed to give reproducibly consistent results.

Another odor test consists of thoroughly working into the fabric a small amount of either pH-9 buffer solution or the standard alkaline perspiration test solution (as specified by the AATCC for testing dye fastness) and smelling the wet fabric while it dries. This latter test is believed to be somewhat less sensitive than the hand odor test, although there is less likelihood of carrying odor from one test to another by improper cleaning of the hands.

Both test procedures have in common the fact that the fabric is subjected to mild conditions that might be met in actual use. Many other proposed tests have the disadvantage that conditions are employed that would never be found in the end use of the fabric. Such tests as heating in strong soda ash or caustic solution are considered to be in this classification.

Too many odor tests should not be carried out in rapid succession, to avoid fatigue of the sense of smell. Also care should be taken to avoid any perfumed soaps in washing the hands before or during the hand odor test since the perfume might well mask any fish odor extracted from the fabric.

The importance of using one of these sensitive odor-detection tests to check plant processing conditions cannot be over-stressed. It is often possible to get a strong positive fish odor test by their use where it is impossible to smell anything in goods that are conditioned in an atmosphere not conducive to odor development. It is believed that if definite fish odors can be detected by either of these tests, these odors will develop under hot humid atmospheric conditions.

Methods have been developed for chemically determining the amounts of various methyl amines formed by the reaction between ammonium salts and aqueous formaldehyde. However, attempts to determine chemically the presence of amines on cloth treated with formaldehyde resin in such a manner that it had a fishy odor have been unsuccessful. Probably the reason for the failure of the chemical methods is the extremely small quantities of material that can be detected by the human nose and the difficulty of chemically determining such low concentrations.

TABLE VIII

COMPARISON OF ODOR DEVELOPMENT FROM AMMONIACAL AND NONAMMONIACAL ACCELERATORS WITH 8% SOLIDS AEROTEX SYRUP 250 CONC ON COTTON FABRIC

Aerotex Accelerator Used	% Urea Based on Resin Solids	Odor Test: Cured 4.5' @ 300° F	Odor Test: Cured 9' @ 300° F	Odor Test: Cured 2.5' @ 350° F	% Shrinkage After 1 Sanf Wash (Cured 4.5' @ 300° F): Warp	% Shrinkage After 1 Sanf Wash (Cured 4.5' @ 300° F): Fill
Untreated fabric	—	—	—	—	5.0	3.5
187	—	Fish	Fish	Fish	0	1
187	5	Trace	Slight	—	0	1
187	10	None	None	—	0	1
UTX	—	None	None	Trace	0.5	1
UTX	5	None	None	—	0.5	1
UTX	10	None	None	—	0.5	1

CONTROL OF MILL PROCESSING CONDITIONS

An examination of available data concerning mill-treated fabrics that had been found to have an unpleasant odor indicated that, in some cases, too severe drying or curing or incomplete washing seemed to have occurred. When fabrics are dried continuously on a plant scale with insufficient exhaustion of the air in the dryer, relatively high humidity will be encountered. In an attempt to duplicate this effect in the laboratory, the bottom of a laboratory oven was covered with wet fabric treated with the same resin solution that was used in the swatch. Because of the high humidity developed in this manner it was possible to extend the drying time of a small swatch at 250°F from one or two minutes to 15 to 20 minutes. Resin-treated cotton fabric dried under conditions of such high humidity was found, after subsequent curing under normal conditions, to have a more unpleasant odor than similar fabric that had been dried and cured in the normally short time. These results were obtained with both urea or melamine resins when an ammonium salt catalyst was present in the impregnating bath. In a similar manner, fabric after resin treatment and normal drying had a greater tendency to have unpleasant odors as the time and temperature of curing were increased. Furthermore, fabric treated with resin, dried in a normal manner, and then given a long high temperature curing (e g, 9 minutes at 300°F or 2½ minutes at 350°F) would retain its fishy odor if it were not neutralized or made weakly alkaline during the washing process. Goods containing no fishy odor after proper washing and neutralization could be made to have a fishy odor if the final drying after washing was carried out at too high a temperature for too long a time. These results indicate that the fish odor is more readily produced when the fabric is subjected to severe conditions of time and temperature during drying, curing or final drying after washing. At no time in this investigation were fish odors developed by curing cycles that were insufficient to develop durable resin properties on the cloth.

Based on the results of the foregoing experiments, the following considerations are important in planning and setting up the various mill operations for resin treatment of fabric:

1) The drying, after impregnation of the fabric with the resin solution, should be carried out with good air exhaustion to prevent excessive humidity build-up in the dryer. As long as the goods come cut of the dryer thoroughly dry, the time and temperature of the drying are not so important as the prevention of this moisture build-up.
2) The curing of the dried goods should be carried out for the minimum length of time at a temperature that gives good fabric properties and durability of finish as determined by physical tests. The use of a high cure temperature will not, of itself, result in fish-odor production as long as an excessive time is not used.
3) The washing operations after drying and curing should be carried out with careful maintenance of the pH of the solutions used to ensure complete neutralization of the *fabric*. Especially in open-width continuous washing, the pH of the solution in the first box will be found to decrease very rapidly during running. A system of feeding alkali and detergent should be worked out to maintain a pH for the washing solution of about 9 to 10; the pH of the second bath should also be maintained with soda ash or sodium bicarbonate to a pH of about 8. The pH of the wet cloth after rinsing should be neutral or weakly alkaline. It is good practice to change the water in all boxes of a continuous washer as rapidly as possible to prevent build-up of impurities in the washing and rinsing solutions. On long runs it may be found that air above the washer has a weak fishy odor. The presence of this odor is an indication that the goods are being made neutral or alkaline and the fishy material is being taken out of the cloth instead of being fixed in it.

TABLE IX
THE EFFECT ON ODOR OF AGING UNWASHED RESIN-TREATED FABRICS

Sample (Urea based on resin solids)	*Cure*		*Initial Odor*	*Aged Months*	*Odor After Aging*
	Time Min	*Temp °F*			
6% Solids Permel Resin on cloth					
No Urea	2.5	350	Fish	8	Fish
No Urea—Bath aged 6 hrs.	2.5	350	Fish	8	Fish
20% Urea	4.5	300	None	8	None
20% Urea	2.5	350	Fish	8	None
20% Urea—Bath aged 6 hrs.	2.5	350	Fish	8	None
10% Solids Aerotex Resin M-3 on cloth					
No Urea	4.5	300	Fish	7	None
No Urea	2.5	350	Fish	7	Fish
5% Urea	4.5	300	None	7	None
5% Urea	2.5	350	None	7	None
10% Urea	2.5	350	None	7	None
7% Solids Aerotex Resin M-3, + 5% Solids Aerotex Resin 160 on cloth					
No Urea	4.5	300	Fish	7	Fish
No Urea	2.5	350	Fish	7	Fish
5% Urea	4.5	300	None	7	None
5% Urea	2.5	350	Fish	7	None
10% Urea	4.5	300	None	7	None
10% Urea	2.5	350	Trace	7	None
20% Urea	2.5	350	None	7	None
5% Accel UTX based on resin solids	2.5	350	None	6	Fish
5% Ditto	1	350	None	6	Fish
7% Ditto	2.5	350	Fish	6	Fish
7% Ditto	1	350	None	6	Fish
15% Solids Aerotex Cream 450 on cloth					
No Urea	9	300	None	2	None
10% Urea	9	300	None	2	None

TABLE X
RECOMMENDED CONCENTRATIONS OF MATERIAL TO BE USED IN THE PAD BATH FOR PREVENTION OF ODOR DEVELOPMENT*

	Aerotex Buffer 190-A		*Aerotex Buffer DCY*	
	% On Wgt. of Resin Products	*% On Resin Solids*	*% On Wgt. of Resin Products*	*% On Resin Solids*
Permel Resin	10	20	2.5	5
Permel Resin with Aerotex Cream 450	10	20	2.5	5
Aerotex Resin M-3	8	10	2.5	3
Aerotex Resin M-3 + Aerotex Resin 160	8	10	2.5	3
Aerotex Cream 450	2.5	5	1	2
Aerotex Syrup 250 Conc	3.5	5	2	2.5

* As use of excessive amounts of urea with Aerotex Cream 450 is apt to decrease the crease resistance and durability of the finish, the amount shown in the table should be considered a maximum for protection where the conditions are most conducive to odor development.

4) The final drying after washing should be just sufficient to dry the cloth and in no case should curing conditions be used, since too severe drying conditions can produce odor in cloth processed correctly up to this point.
5) Sufficient urea or dicyandiamide should be added to prevent odor development. The amount of these compounds that is needed to prevent odor and that can be added without modifying the desired finish varies with the resins used as shown in Table X.
6) The use of ammonia, ammonium salts, formic acid, and its salts should be avoided wherever possible.
7) Nonammoniacal catalysts should be used in place of ammoniacal catalysts if there is any likelihood of odor development.

REFERENCES

(1) Balson, E W and Lawson, A, *Biochem J* 30, 1257 (1936)
(2) Crocker, E C and Sjorstrom, L B, *Chem Eng News* 27, 1922 (1949)
(3) Degering, E, et al, *An Outline of Organic Nitrogen Compounds*, P. 88, John S Swift Co, Inc, Cincinnati, 1942
(4) Elliott, G H, *J Soc Dyers Colourists* 60, 273 (1944)
(5) Levy, M, *J Biol Chem* 105, 157 (1934)
(6) McCord, C P and Witheridge, W N, *Odors, Physiology & Control*, p 29, McGraw-Hill Book Co, Inc, New York, 1949
(7) Moncrief, R W, *The Chemical Senses*, p 80, John Wiley and Sons, Inc, New York, 1944
(8) Steinhardt, J, Fugitt, C H, Harris, M, *J Biol Chem* 165, 285 (1946)
(9) Whitmore, F C, *Organic Chemistry*, p 198, D Van Nostrand Co, Inc, New York, 1937

DISCUSSION

Question: Does not the extra urea added to prevent odor take part in the stabilization process?

Answer: The extra urea only prevents odor formation; in the amounts recommended it does not impair tensile strength or other properties.

Q: Can you explain why formic acid promotes the formation of odor?

A: We have been able to produce fish odors in textiles by the action of only formic acid and formaldehyde on textiles in spite of the absence of nitrogen-containing compounds. We do not know why this happens but are seeking the reason.

Q: Do you know the minimum amount of resin finish on textiles that may produce odors under laboratory conditions?

A: We do not, as we have always employed amounts effective for giving a useful finish.

Q: If curing conditions determine odor formation, how do you account for the development of odor during the storage of goods where there is no odor originally?

A: In general there is a tendency to lose odor rather than to produce it in the aging of textiles. The one case where more odor developed occurred when there was an ammonium sulfate catalyst present, which undoubtedly promotes odor formation.

Q: Why is odor formation more prevalent in summer than winter?

A: Greater humidity in summer probably promotes more hydrolysis of amine acid salts.

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

50-51

Education: Textile Institute of Enschede, Holland, with employee training in Switzerland and Bradford, England.

Experience: Eleven years management of dyehouse and bleachery operations, covering cotton, wool and synthetic fibers.

Age 33: married, position in U S A desired.

2-19, 3-5

51-3

Education: B S, Chemistry.

Experience: Chemist and dyer, rayons.

Age 28; married; references; north Atlantic coast preferred.

3-5, 3-19

51-4

Education: B A, with year of graduate study.

Experience: Chemist, technical sales and service in textile industry, resins.

Age 31; single; location not restricted.

3-5, 3-19

51-5

Education: B S, Textile Chemistry & Dyeing.

Experience: Textile laboratory and finishing plant.

Age 25; single; references; eastern U S preferred.

3-5, 3-19

MEMBERSHIP APPLICATIONS

SENIOR

Gordon S Bradley—Student, New Bedford Textile Inst, New Bedford, Mass. Sponsor: F Tripp.

Murray Rosen—Student, New Bedford Textile Inst, New Belford, Mass. Sponsor: F Tripp.

Peter A Cook—Clemson College, Clemson, S C. Sponsor: J Lindsay, Jr.

William P Creighton—Clemson College, Clemson, S C. Sponsor: J Lindsay, Jr.

Coy J Gray—Clemson College, Clemson, S C. Sponsor: J Lindsay, Jr.

Wilbur K Hammett—Clemson College, Clemson, S C. Sponsor: J Lindsay, Jr.

Charles B. Morris—Clemson College, Clemson, S C. Sponsor: J Lindsay, Jr.

John G Rothell—Clemson College, Clemson, S C. Sponsor: J Lindsay Jr.

Wililam C Wylie, Jr—Clemson College, Clemson, S C. Sponsor: J Lindsay, Jr.

Kenneth D Brown—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Angel Chaufan—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

William L Douglas—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Charles R Faircloth—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

William H Floyd, Jr—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Thomas L Graves—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Homer S Howell—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Arthur Hurvitz—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

George C Lindsey—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Richard D Neal—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

William S Ramey—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Jack C Webb—Georgia Inst of Technology, Atlanta, Ga. Sponsor: C A Jones.

Edward G Hochberg—Lowell Textile Inst, Lowell, Mass. Sponsor: E E Fickett.

Applications for Transfer to Senior Membership:

Stephen R Tomko

Walter F Wigglesworth

General Technical Meeting——

A BUSINESS APPROACH TO CONSUMER STANDARDS*

THOMAS C BLAISDELL, JR

Former Assistant Secretary of Commerce of the United States

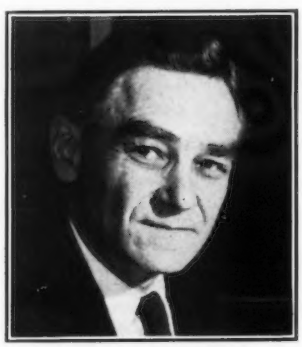
I AM not a textile technician. I am an economist and a bureaucrat who for many years has interested himself in the ways people make a living and collectively create the wealth of nations.

In various parts of the world I have been impressed by the aesthetic as well as by the utilitarian importance of textiles in the patterns of national cultures. Almost instinctively we tend to judge and classify nations according to the skills with which they make textiles and the artistry with which they use them.

Archaeologists measure the richness of ancient cultures by the evidence of accomplishment in the textile arts. Only a few days ago, in Southwest Colorado, I saw with great interest the swatches of textiles woven by the Pueblo Indians of the caves in Mesa Verde sometime in the eleventh and twelfth centuries. The fine fabrics of past ages remain a joy to many of us whether we are technicians or not, but the greatest joy has been created by our growing ability to make textiles available to more and more people throughout the world at steadily declining costs. These declining costs are represented not only in terms of money; they are represented by the declining necessity for using the muscles and eyesight of men, women and children, and by the building of intricate machines driven by mechanical power to turn out textiles by the millions of yards.

The application of power to the cotton textile industry first in England, then on the European Continent, and later in other parts of the world, was the foundation of the modern textile industry. We have seen the creation of various raw materials and a constant increase in the variety of fabrics. Not only has this increase in the different kinds of material created the opportunity for giving more and more wealth to the people of the world, but it has created a whole series of textile problems.

Modern technology creates new wealth, new blessings; but it also brings with it new problems. For instance, mass production—and mass consumption—would be impossible without a high degree of standardization. And at the same time, as a mass-production economy becomes more complex, the problem of obtaining agreement on standards becomes more difficult. That problem is the subject of my remarks today.



Thomas C Blaisdell, Jr

The speaker points out how standardization is necessary in the mass production of textile and other consumer goods. He explains how our government assists in the establishment of various kinds of useful standards for industry, such as standards of measurement, standards of performance, standards of practice and standards of quality.

Private enterprise has developed brand names, trade-marks, advertising and labels to inform and assure customers with respect to the quality of consumer goods. The author especially emphasizes the importance of accurate and informative labeling in the promotion of the sales of textiles to the ultimate consumer. The Federal Trade Commission of the U S Department of Commerce has greatly assisted in this whole problem of maintaining the faith of the public in labels and advertising and in American competitive business in general by weeding out unfair trade practices, such as dishonest advertising, false labeling, and short weight. The Commission at the same time has the responsibility of administering compulsory labeling, such as that required by the Wool-Products Labeling Act.

The growth of commonly accepted standards has made possible the mass production of goods on a scale heretofore unknown. And we can only guess at possibilities of even greater achievement in mass production as the result of further standardization. The necessity for governmentally established standards has been recognized for many years. Some of you will recall that the adoption of the metric system was a dramatic and highly useful standardization of measurement. The necessity for bringing the metric standard of measurement together with some other systems, such as our own pragmatically developed system, has created some of the most interesting problems in the modern technical world. Agreement on internationally accepted standards is recognized by many as a great step forward in extending the wealth-producing possibilities of the Western world.

The kinds of standards that have been developed in the whole standards movement was summarized many years ago by the Director of the Bureau of Standards when he classified standards as follows: standards of measurement, standard constants, standards of quality, standards of performance and standards of practice. The ability to compare, to reproduce and to explain many developments is made possible only by the general acceptance of standards.

The acceptance of agreed standards of quality has become more and more necessary in the field of production. By the same token, such standards have become of significance in the field of distribution. Today we are concerned with another phase of the problem: to what extent should we make standards available to consumers so that they may know what they are buying?

Individual business firms have long known the value of informing their customers of the quality of their products. And they have protected their reputation for quality in interesting ways. We all remember that Spearmint gum was not available during the war. I understand

* Presented at the 29th Annual Convention at Portsmouth, N H, on September 28, 1950.

that the Wrigley Company refused to manufacture this familiar product because the proper ingredients were not available to keep it up to the expected standard of quality. We know also that some major distributors, such as Sears, Roebuck and Macy's, have maintained their own testing laboratories to make sure that the goods they buy for resale measure up to what they consider their own standards.

Such practices make good business sense. A satisfied customer is a steady customer. In our economy, customers are as fully aware of quality as of price. But the bettering of quality and the improvement of methods of testing to assure that quality are not sufficient. The consumer must become more skilled in judging for himself the ingredients of high quality. The time is past when we can ask people to place their complete reliance upon brand names without telling them why the product is good.

Advertising and labeling, when properly used, have accomplished this end to some extent. As we all know, however, they have not always been properly used. In fact, their misuse has been so frequent as to cause the Federal and State governments and industry itself to take action to bring a stop to abuse and to instill renewed confidence in the commodities that are properly represented to the public.

Federal laws have been promulgated controlling labeling. Among these laws two of the most important are the Food, Drug and Cosmetics Act and the Wool-Products Labeling Act of 1939. As you probably know, the United States Department of Agriculture administers the Food, Drug and Cosmetics Act, and that Department sets up standards and requires labeling to denote compliance with those standards. We need only make a trip to the grocery store with our wives to discover what this Act means to the housewife.

Most of you are familiar with the Wool-Products Labeling Act of 1939, which has been interpreted and administered by the Federal Trade Commission. In requiring the labeling of a commodity as to its wool-fiber content and in differentiating between new, reprocessed, and reused wool, it has done much to educate the consumer as to the kind of wool and the different kinds of fibers that may be in the commodity purchased.

By far the greatest effort to control quality and to label goods for the consumer has been made on a voluntary basis by industry itself. This is effected in various ways: through trade brands; certification by various testing organizations; informative labeling; standards adopted by technical organizations such as your own, the American Society for Testing Materials, and the Society for Automotive Engineers; standards adopted by trade associations; and commercial standards adopted by industry in cooperation with the Commodity Standards Division of the Department of Commerce.

Brand names, through advertising and labeling, have become household bywords. A brand name is an assurance of quality. A brand name is also an assurance of value. It is the modern equivalent of the personal relationship that existed between the craftsman and the customer before the days of mass production. But while brand names are an assurance of value, they are not enough to satisfy the consumer's hunger for more knowledge about the things he buys. For one thing, there are so many brand names. Which brand is better? What are the features of one brand as compared with another? The almost universal curiosity of consumers in the criteria of value is evidenced by the rapid growth of consumer groups and consumer services.

Industry itself in numerous instances is having its commodities certified by various testing organizations, and such commodities are labeled and advertised as "Tested and approved by the John Doe Laboratory." In practically every instance the standards by which such a commodity is judged as being satisfactory are those set up by the certifying organizations. It is hardly necessary for me to point out that some so-called "testing laboratories" are not motivated solely by an unimpeachable zeal for safeguarding the interests of consumers.

This approach to buying on the part of the consumer has stirred and should certainly continue to stir business competition. This increasing demand for more informative labeling is a challenge that business men cannot afford to disregard as small talk. For some years far-sighted merchandisers have recognized the popularity of informative labels. Their cash registers quickly told them that it was good business from the profit standpoint to give consumers what they want; and consumers generally want what they understand. Facts are not destroyed by our failure to give them recognition. What happens psychologically when a person gets "stuck" on some product that he buys, trusting in the label or the advertisement? He loses faith in the firm that sells the product and in the firm that makes it. In addition, it is reasonable to believe that he loses some part, however small, of his faith in American business.

One of the purposes of the Federal Trade Commission is to maintain faith in American business by weeding out unfair trade practices. Incorrect advertising and labeling are considered unfair practices. One of the departments of the Federal Trade Commission issues complaints against individual organizations concerning unfair advertising or labeling. If after complete investigation the complaint is found to be justified, "cease and desist" orders are issued. Another department of the Federal Trade Commission co-operates with business in promulgating for business what are known as "Trade Practice Rules." These rules are issued in two groups: the first is based on the requirements of specific laws and the second is recommendations to the business to assure good trade understanding. So far, several Trade Practice Rules have been promulgated covering various fields of the textile industry. For the most part, in addition to the usual trade agreements covering such things as "discounts" and the like, the rules cover the labeling of textiles as to fiber content. Such rules generally do not require labeling but specify how the textiles should be labeled if labeling is done.

An informative label is the best method of assuring good trade practice. In effect, it not only strengthens consumer reliance in the producer's and distributor's good faith, but it enables the consumer to decide for himself whether the product is of the quality he desires. To most consumers the brand is an assurance of quality and value. But an informative label is a method by which producers and distributors aid consumers in making a choice. With a multitude of purchases to make daily, the consumer needs and wants intelligible facts presented in simple, easy-to-grasp, quickly understood form.

As I am using the expression "informative labeling," it means any type of labeling that gives information concerning the quality of the product. There are two schools of thought regarding the extent to which manufacturers and distributors should go in educating the customer. According to one school of thought, an informative label should include as much technical information as possible concerning the product. With regard to textiles, for example, the label should include such information as breaking strength and number of yarns to the inch in both the warp and the filling; its resistance to fading in light, laundering or cleaning, dry and wet pressing, atmospheric gases, etc.; its resistance to water penetration depending on the use of the products; its fiber content; and other characteristics depending on the type of product and its use. The other school of thought prefers a simpler type of label carrying reference only to compliance with a standard of

quality of national recognition amplified where necessary by instructions concerning care in the use of the product. These instructions may include such items of care as will indicate whether the product is washable or should be dry-cleaned, and, if washable, the method to be used.

The opponents of the elaborate informative labeling plan feel that the average consumer is not sufficiently versed in the pros and cons of the necessary properties of a product to use the information intelligently. He is confronted with a lot of data which may vary but slightly among the products of different manufacturers. Although these slight differences may have no bearing on the quality of the product, he, not knowing that, may be induced to purchase the most expensive.

The proponents of the elaborate informative labeling plan feel that such a plan makes it possible for a consumer to make his own comparison between products. The consumer is thus in a position to purchase to his best advantage. As regards the lack of technical knowledge by the average consumer, the proponents feel that this difficulty can be overcome by educational advertising and by other means of publicity.

Before informative labeling can be adopted by a branch of an industry, four conditions must be met:

1) There must be accepted standards on a national basis for qualities on which it is important to give information;
2) There must be accepted terminology to express those standards;
3) Means must be adopted, by voluntary or government action, to make sure that misleading terms are not used; and
4) Means must be found for educating the consumer as to what the accepted terminology means in terms of service and use.

The general subject of informative labeling is highly controversial. But by far the most controversial phase of the subject is what is known as "grade labeling." As Miss Jessie V Coles in her book *Standards and Labels for Consumer's Goods* puts it, "Grade labeling appears to some people to be the most important, if not the only aspect of the subject of standards and labels for consumers' goods. It has been discussed by more people, at greater length, and the discussions have generated more heat than any other phase of the subject. Whether or not consumers' goods should be labeled according to grades based on standards, especially whether or not grade labeling should be compulsory, is an honest-to-goodness controversy."

Much of the controversy over grade labeling developed at times when proposals were made that it be made mandatory. Compulsory grade labeling was put into effect on certain products by the OPA during World War II as a means of establishing some of its price orders. Subsequently, however, compulsory grade labeling was entirely eliminated.

Voluntary grade labeling has been found to be practical for a number of consumers' goods, but so far it has been applied to only a limited range of products.

Everyone who has plunged into the turbulent problem of grade labeling has discovered quickly that the real difficulty lies in deciding what terminology to use. Iler J Fairchild, when Chief of the Trade Standards Division of the National Bureau of Standards (now the Commodity Standards Division of the Office of Industry and Commerce) investigated this subject thoroughly and found a hodgepodge of grade terminology being used for the 64 commodities investigated. He found no solution to the terminology problem, but he did arrive at the following conclusions and principles which he felt deserved consideration:

"1) It seems rather obvious that grade terminology and designations have been developed by specialists in their particular fields and that, broadly speaking, the grading systems are not co-ordinated.

"2) There is an underlying complexity based on diverse methods of test, diverse criteria, characteristics and uses; and this complexity is real, deserving of respect, difficult to simplify, and may not lightly be brushed aside.

"3) In setting up grade designations or terms, provisions should be made for future developments, even those unforeseen and unpredictable improvements which from time to time occur in most every field, and toward which we are constantly striving.

"4) A master order of grade terms might well be considered, starting with the lowest present grade at the bottom and proceeding upward in the direction of the ideal, with plenty of room at the top for unforeseen developments. Possibly this could follow the order of numerical designations of types for colorfastness to light of woven fabrics. There will doubtless continue to be some products for which it is impracticable to make a general decision as to what is the ideal, such as in the SAE steels, in the fertilizers, or feldspar. But, perhaps, even for these commodities, the individual identification or designation for each criterion might be arranged in the order toward the ideal, with room at the top for unforeseen radical improvements.

"5) In spite of the present confusion, complexity, or obvious absence of foresight in establishing grade terminologies, there seems to be room for considerable further co-ordination, simplification, allowance for future progress, and further study of the underlying principles for the formulation, selection, and revision of grade terminology systems to the end that they may be as simple, consistent, and understandable as may be practicable, as flexible for accommodation of future developments and as enforceable as possible."

I have referred to the need of standards that will have a nationwide acceptance. These are essential for any type of labeling which may be employed—informative, grade or those indicating compliance with a standard. The Department of Commerce is prepared, through its Commodity Standards Division, to assist industry in formulating, developing, and promulgating its own standards. These programs are purely voluntary and have not and will not be fostered as "must" programs. They are provided to businessmen as a means whereby standards and simplified practices can be negotiated when requests for such aid are initiated by business, and when such standardization is in the interest of the consuming public.

The Department of Commerce acts as a co-ordinating body in bringing together the viewpoints of the producing, distributing, and consuming elements of an industry. The agreed-upon standard is then distributed among all interested for written acceptance. After we receive acceptances representing a satisfactory majority of the production, distribution, or consuming volume and if we have no active and valid opposition from anyone, the standard is promulgated as a recorded voluntary standard of the trade.

Each commercial standard contains the recommended wording of a statement to be printed on a label indicating compliance with the requirements of the commercial standard. This recommended wording is the consumer's guarantee that he is obtaining a product which will give him satisfaction for the purpose intended.

The wording of this identifying statement is as follows:

> "These .....s comply with Commercial Standard CS....., as developed by the trade, under the procedure of the Commodity Standards Division and issued by the U. S. Department of Commerce."

In numerous instances groups of manufacturers and trade associations have not been content to use only the identifying

(Concluded on page P168)

Auxiliaries and Testing Group—

THE MEASUREMENT OF STATIC ELECTRICITY ON FABRICS*

MASON HAYEK and F C CHROMEY

Contribution No 91 from Jackson Laboratory
E I du Pont de Nemours & Co, Inc

During the course of a study of problems arising from the static electrification of textile materials, it became necessary to devise a means of measuring static electricity on fabrics. This paper describes the instrument that was developed for the purpose and summarizes some of the pertinent information on static electricity.

The instrument combines a machine for generating charges on fabrics and a means of measuring those charges. The test fabrics are mounted on a cylinder and charged by friction against a second surface, and the charge is measured electronically. The working parts of the instrument are housed in a metal box to permit humidity control. Examples of tests on fabrics treated with antistatic agents and untreated controls illustrate the kind of data obtained with the instrument and show how the static propensities of the test specimens depend upon the rate of decay of electrostatic charge on the surface, that is, on the surface electrical conductivity.

INTRODUCTION

DIFFICULTIES arising from the static electrification of textile materials are widely known. They are encountered in mill processing, fabric handling and throughout the period of fabric service. In mill processing and manufacture the accumulation of static charges can be controlled by adjustment of the relative humidity and the use of suitable finishes. During the course of a study of these problems it became necessary to devise a means of measuring static electricity on fabrics. This report describes the instrument that was developed for that purpose and summarizes some of the pertinent information on static electricity.

The production of static electricity on a fabric or other surface results from friction of that surface with another surface. Mere separation of two surfaces after contact will also produce a static charge. The electrification results from a transfer of electrical charges from one surface to the other.

The simplest explanation of this phenomenon is that there is a transfer of electrons from one surface to another, and this depends upon differences in the affinities of the surfaces for electrons. Thus, when a metal is rubbed against wool, the metal tends to assume a negative charge because of its greater affinity for electrons, while the wool becomes positive. The true mechanism of electrification may involve a number of factors, but the transfer of electrons is sufficient for consideration here. Of course, the presence of a charge on a surface can be detected only if the conductivity of the material is low enough for the charge to remain on the surface an appreciable time.

Lehmicke *(1)* described the effects of static electrification in textile processing, and some of the same effects are met when fabric surfaces become charged. Sufficient static electricity may accumulate to cause sparking or to cause discomfort to the wearer of a charged garment because of the attraction of the fabric for the body. Charged fabrics may be difficult to handle during cutting operations. Finally, charges on fabrics are responsible for part of the soiling of those fabrics because of the attraction for oppositely charged dust particles.

Many investigators have prepared lists of solid substances arranged in such an order that when any two substances in the list are rubbed against one another, the substance higher in the list assumes a positive charge, thus forming a so-called "electrostatic series." The electrostatic series devised by Lehmicke *(1)* is shown in Table I.

TABLE I
ELECTROSTATIC SERIES
ACCORDING TO LEHMICKE

Positive End
Glass
Human hair
Nylon yarn
Nylon polymer
Wool
Silk
Viscose Rayon
Cotton
Paper
Ramie
Steel
Rubber
Acetate Rayon
Orlon acrylic fiber
Saran
Polythene
Negative End

The electrostatic series serves as a useful rule of thumb to predict the behavior of one substance when rubbed with another, but it cannot be used indiscriminately. The nature of a charge produced on a surface is dependent upon the test conditions, the physical condition of the surface, and the presence of impurities and adsorbed gases.

For a quantitative description of the charge produced on a surface, something must be known of the electrical conductivity of the surface. The greater the conductivity, the more rapidly a surface charge will be dissipated. Thus, the charge on a surface is the resultant of two factors: first, the charge that would exist if there were no loss of charge, and, secondly, the rate of loss of charge. If the loss of charge is sufficiently high, no charge can accumulate. In our consideration of the surface electrical conductivity of the fabric we may limit our attention to the dissipation of charge to the ground.

The importance of surface conductivity and moisture content of the fabric on the electrostatic charge already has been recognized. Walker *(2)* explained the conductivity of cotton by relating it to the surface distribution of moisture within the submicroscopic structure of the cotton fiber. He found that a weight of water slightly greater than one per cent of the fiber weight would be required to form a monomolecular layer of water on all internal surfaces of the cotton fiber. Slater *(3, 4)* found that the conductivity of cotton was over one thousand times greater at 60 per cent relative humidity than at 20 per cent, although the moisture content rose only 5 per cent. Denham and coworkers *(5)* reported that the conductivity of silk increased tenfold when the relative humidity was raised from 75 to 80 per cent.

Several investigators have found quantitative relations between the conductivi-

* Presented by Mason Hayek at the Annual General Meeting in Portsmouth, N H, Sept 30, 1950.

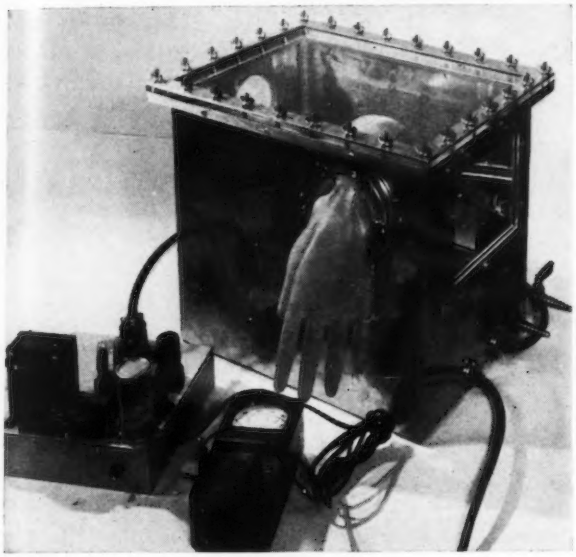


Figure 1

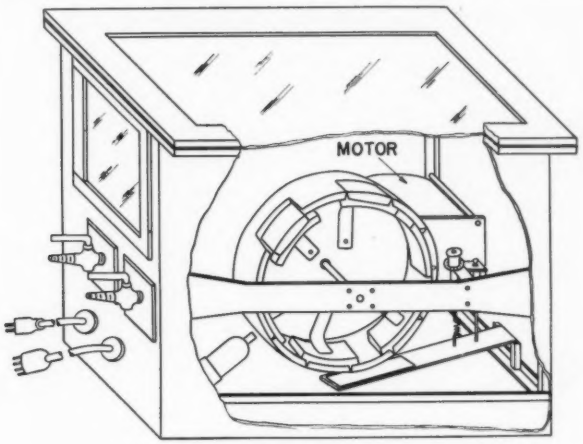


Figure 2
Static Machine

ties and moisture contents of textile fibers. Murphy and Walker *(6)* discovered that the electrical resistance of their textile samples was determined by the moisture content of the specimens. When the logarithm of the resistance was plotted against the logarithm of the moisture content, a straight line was obtained whose slope depended upon the nature of the material, cotton, silk or wool, but was independent of the form of the sample and of the amount of impurities in the textile. Marsh and Earp *(7)* and Baxter *(8)* found that Ohm's law was obeyed by wool fibers at relative humidities of 50 to 85 per cent and noted a great dependence of resistance on moisture regain of the fibers. Recently Keggin and co-workers *(9)* reported their experiments on the electrical resistances of, and magnitudes of charges produced on, eight different types of fibers. The charges were produced by passage of the fibers through a cotton flat-carding engine. The magnitude of the charge produced on a fiber was found to be dependent upon the moisture content of the fiber, and a straight-line relationship was found between the logarithm of the resistance and the percentage of water in a fiber. It was observed that the cellulose fibers, cotton, flax, and viscose, normally developed a much smaller static charge than the protein-type fibers, wool, casein, Ardil, and nylon. Not until the moisture contents had reached levels corresponding to relative humidities below 10 per cent did the charges on the cellulose fibers equal those developed on the protein-type fibers at relative humidities of 60 to 70 per cent.

THE MEASUREMENT OF STATIC ELECTRICITY ON TEXTILE MATERIALS

In the study of static electricity on textiles it was desirable to have a method which would indicate not only the total charge that could be produced on a test specimen under a given set of conditions, but also one which would give information on the rate of decay of charge, that is, a measure of the conductivity of the specimen. No equipment suitable for such measurements had been described in the literature. Previously described methods measured only the total charge produced. The instrument that was developed combines a machine for generating charges on fabrics and a means of measuring those charges. The entire instrument is shown in Figure 1, and the drawing, Figure 2, shows the assembly of the working parts of the instrument in the aluminum box used for humidity control. Figure 3 shows the working parts of the static machine, and Figure 4 is a top view of the machine as it is housed in the metal box. Figure 5 shows the details of the device for applying friction to test fabrics during charging. The diagram for the electronic circuit is shown in Figure 6.

The machine itself is mounted in an aluminum box, which can be sealed after the test fabrics are placed in it and in which the relative humidity can be adjusted to permit testing under a wide range of humidity conditions. Access to the machine is gained through rubber gloves mounted on the box. The working part of the instrument consists of an aluminum cylinder mounted on a shaft, which is geared to a motor so that it revolves at approximately 300 revolutions per minute, a device for generating a charge on test fabrics that are mounted on the cylinder, and an electronic tube with its attached electronic circuit for measuring the charge developed. The various parts of the instrument, including the tubes and electronic circuit, are all readily obtainable.

The construction of the static machine may be described in some detail. The cylinder on which the test specimens are mounted was fabricated from a section of 6-inch aluminum pipe, 2½ inches wide. There are six removable portions around the periphery of the cylinder, which are 1⅝ inches along the cylinder and 1½ inches wide. The removable portions are held in place by spring clamps and are designed, as shown, to hold the fabric

TABLE II
ELECTROSTATIC TEST DATA FOR VARIOUS FABRICS

Fabric	*Charge*	*Half-life Period, Seconds*	*Charge at One Minute*	*Full-life Period, Seconds*
Untreated wool	170	—	160	—
Untreated cotton	35	9	—	55
Untreated nylon	145	—	142	—
Nylon + 0.5% Agent "A"	1	<1	—	<1
Nylon + 0.3% Agent "A"	6	2	—	8
Nylon + 0.2% Agent "A"	48	7	—	45

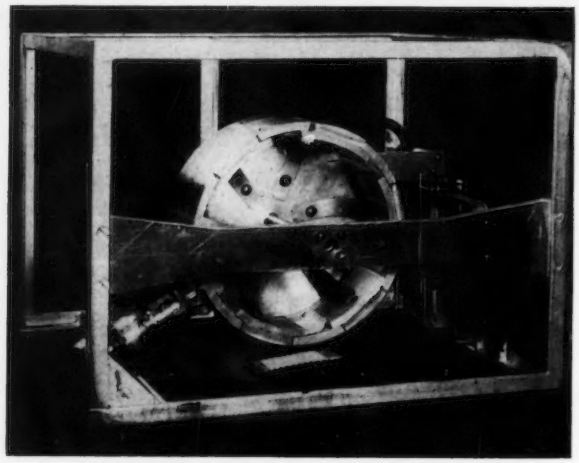


Figure 3

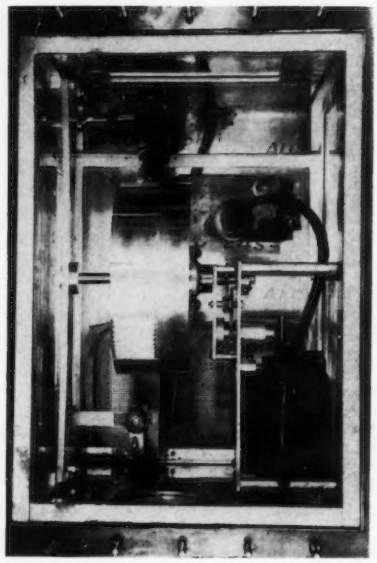


Figure 4

taut during the test. The shaft on which the cylinder is mounted is supported at each end by ball bearings and is geared to a 1750-rpm motor. The electrification of the test fabrics is effected by friction with a second substance, usually another piece of fa ric, which is supported on a brass strip beneath the cylinder. The details of this part of the static machine are shown in Figure 5. The brass strip is held at one end on two posts mounted on the frame of the machine, and it is supported near its center with a spring, which is, in turn, attached to a vertical rod threaded at the top and fitted with a calibrated knob. The knob is calibrated from 0 through 7. Adjustment of this knob changes the tension on the spring and thus determines the amount of friction applied by the contacting surface to the test fabric. The support that holds these parts for applying the friction is also fitted with a vertical shaft, which is used to move the brass strip and rubbing material away from the cylinder. A small straight spring fits into a notch near the top of the shaft to hold the shaft down when the latter is depressed. By this means the friction against the test material can be stopped instantly, and the same friction can be applied again when necessary.

The electronic circuit utilizes a floating grid. It is so constructed that successive impulses of potential on the grid of the electronic tu'e induced by the charged fabrics on the adjacent cylinder passing the tube are amplified, detected and measured on a peak voltmeter circuit. The magnitude of this current is then a measure of the charge on the fabric. A 6J7 tube is used for detecting the charge on the test specimens. The tube should be as close as possible to the cylinder without coming into contact with the fabrics.

In some cases it is useful to use an oscilloscope instead of the rectifier and microammeter in the circuit. The oscilloscope is then connected to the plate of the 6J7 tube. Characteristics of the current produced in the circuit can be measured in this way. Moreover, if an oscilloscope is used, as many as five test fabrics can be tested at once. When five fabrics are on the aluminum cylinder, five peaks are observed on the oscilloscope, and the heights of these peaks indicate the relative charges on the five test specimens. (With five fab-

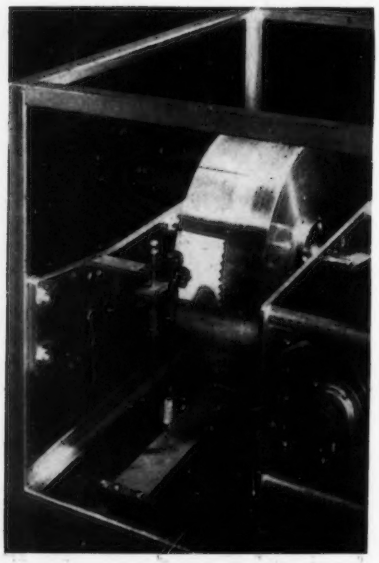


Figure 5

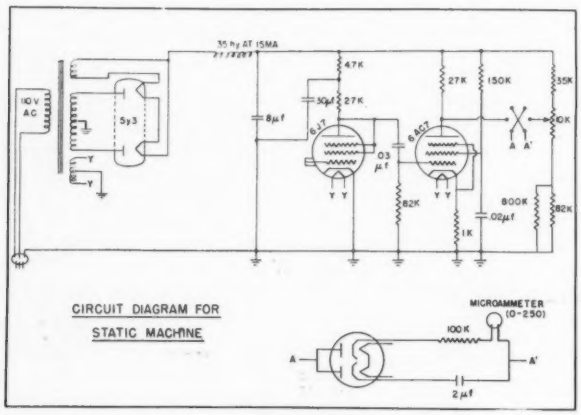


Figure 6
Circuit Diagram for Static Machine

rics instead of six, there is a space between two of the peaks on the oscillograph, thereby permitting the identification of a given peak with a given test fabric.)

The static machine is mounted on a steel frame, which is supported in the aluminum box. The outside dimensions of the frame are 10 inches by 11⅞ inches by 10⅛ inches high. The frame fits snugly into the box and is supported two inches above the bottom. A desiccant, salt solution or the like, can be placed in the space at the bottom to control the humidity. Gas inlet and outlet valves are mounted on the box to facilitate establishment of a given humidity by replacement of the air in the box with air of the desired humidity or with dry nitrogen. The outlet for the motor on the machine is mounted on the bottom inside the box near one end, and a switch is attached to this outlet. Extension cords for the motor and electronic circuit pass through one end of the box. The box is fitted with two windows of "Lucite" acrylic resin and a top of the same material.

Arbitrarily selected standard conditions have been set up for carrying out routine static tests on fabrics. The tests are conducted at room temperature at the desired relative humidity. Three pieces of fabric of standard dimensions are mounted on the cylinder at equidistant positions after they have been conditioned in the box. Portions of scoured, untreated fabrics are generally used for the contacting surface. Four measurements are taken for each test: 1) the "charge" (actually the current in microamperes) two minutes after friction is applied; 2) the half-life period of the charge, or the time required after the friction is stopped for the charge to drop to one-half of its peak value; 3) the charge one minute after friction is stopped; 4) the full-life period of the charge, the time required for the microammeter reading to drop below one. Untreated fabric is tested as a control.

The reproducibility of the charge produced on the machine is of the order of 25 per cent. However, the reproducibility of the rate of decay, or the half-line period, of the charge is considerably better, of the order of 10 to 15 per cent. As explained below, it is believed that the rate of decay of charge is the more important measurement. The experimental errors are much smaller than the differences between data for fabrics of different static propensities.

DISCUSSION

The study of electrostatic charges on fabrics has shown that in measurements with the static machine the rate of decay of charge is probably more important than the total charge produced on a fabric as far as static propensity is concerned. The rate of decay of charge is a measure of the electrical conductivity of the test specimen, and the magnitude of the charge produced is dependent upon that conductivity. Moreover, the particular means of generating the charge determines the magnitude of the charge but does not affect the conductivity.

The type of data obtained with the static machine is shown in Table II, where results are given for tests on some untreated fabrics. All data are for a relative humidity of 25 ± 3 per cent. The fabrics listed in this table and the following tables were electrified by friction against untreated nylon fabric.

Untreated wool and nylon both acquired large charges, and those charges decayed slowly. Untreated cotton could be charged, but not to the extent found for wool and nylon, and the half-life period of the charge was nine seconds. The charge was lost within one minute. Treatment of nylon with 0.5 per cent of the antistatic agent almost completely eliminated charge formation, and decreasing the concentration of the agent on the fabric permitted an increase in the charge formation, as well as an increase in the half-life and the full-life periods of the charge.

The data in Table III illustrate the dependence of charge and rate of decay of charge on the relative humidity and substantiate other observations described in the literature. As the relative humidity and, consequently, the moisture contents of the fabrics increased, the rates of decay of charge also increased. In the case of cotton, the decay increased to such an extent with increase of humidity that the total charge produced dropped almost to zero. For nylon the total charge decreased slightly as the humidity was increased, but the increase in rate of decay was pronounced.

The effects of varying the relative humidity upon the behavior of two antistatic agents are shown in Table IV.

The dependence of treated fabrics upon humidity is similar to that of untreated. The behavior of a good agent can be nullified by a sufficient reduction in humidity. Effectively, the antistatic agent makes the electrostatic behavior of the fabric more like that of cotton than of nylon.

TABLE III

ELECTROSTATIC TEST DATA FOR UNTREATED FABRICS AT VARIOUS RELATIVE HUMIDITIES

Fabric	*Relative Humidity, Per Cent*	*Charge*	*Half-life Period, Seconds*	*Charge at One Minute*	*Full-life Period, Seconds*
Cotton	10	100	390	85	—
	32	3	1	—	1.5
	56	0.5	<1	—	1
Nylon	10	165	—	164	—
	32	145	—	135	—
	56	145	23	18	120

SUMMARY

An instrument has been developed for studying the electrostatic properties of fabrics. This instrument is described and its use and advantages are discussed. A brief historical survey of the electrification of textile surfaces is given. Examples of tests on fabrics treated with antistatic agents and untreated controls show how the static propensities of the test specimens depended upon the rate of decay of electrostatic charge on the surface, that is, on the surface electrical conductivity.

REFERENCES

(1) Lehmicke, D J, *Am Dyestuff Rep* 38, 853 (1949).

(2) Walker, A C, *Bell System Tech J* 16, 228 (1937); Cohn, E M and Guest, P G, *Bur Mines Circular I C* 7286, 33 (1944).

TABLE IV

EFFECT OF RELATIVE HUMIDITY

Fabric	*Relative Humidity, Per Cent*	*Charge*	*Half-life Period, Seconds*	*Charge at One Minute*	*Full-life Period, Seconds*
Nylon + 0.05% Agent "A"	7	115	—	89	—
	19	66	—	35	—
	30	14	6	—	20
Nylon + 0.30% Agent "A"	7	139	—	88	—
	19	80	10	3	—
	30	1	—	—	1
Nylon + 0.05% Agent "B"	7	125	—	70	—
	19	127	32	40	—
	30	22	6	—	63

(3) Slater, F P, *Proc Roy Soc, London* 96B, 181 (1924).

(4) Slater, F P, *J Textile Inst* 16, 53 (1925).

(5) Denham, W S, Hutton, E A and Lonsdale, T, *Trans Faraday Soc* 31, 511 (1935).

(6) Murphy, E J and Walker, A C, *J Phys Chem* 32, 1761 (1928).

(7) Marsh, M C and Earp, K, *Trans Faraday Soc* 29, 173 (1933).

(8) Baxter, S, *Trans Faraday Soc* 39, 207 (1943).

(9) Keggin, J F, Morris, G, and Yuill, A M, *J Textile Inst, Transactions* 40, T702 (1949).

QUESTIONS

Q: I think you have developed a very interesting machine. You referred to the fact that you can examine a number of samples at one time. Is there any tendency for migration of finishing agents from treated materials to untreated materials?

A: It would depend upon the affinity of the agents for the fabrics. In some cases you have an agent that is very loosely held on the surface. For instance, if it is a powder, you would almost certainly rub some off one fabric on to the other, but in most synthetic fabrics we have treated we have found only slight migration from one fabric to another.

Q: What is the time?

A: We generally use a charging period of two minutes.

Q: Do I interpret the electrostatic series correctly in this way: the farther apart are the materials in the list, the greater would be the charge?

A: Yes.

Q: What could one expect if a positively charged resin is added to a fabric?

A: In general I should say that there would be a greater charge on the surface of the cotton because the surface would have lower conductivity.

Q: In your machine the circumference of your wheel is not continuous, that is, you have six strips instead of one continuous strip. Why?

A: The electronic circuit is set up so that it is not the adjacent charge that activates the circuit but rather the impulse of the charge as the charged surface passes the electronic tube. Is that clear?

Q: No.

A: If we had a continuous fabric on the circumference, no charge would be produced or indicated on the micrometer. It is the change of the electrostatic field that activates the circuit.

Q: You have said there is no durable antistatic agent. Must an antistatic agent necessarily be nondurable?

A: No. The requirement for electrostatic properties and the requirement for durability are probably not related.

Q: Do you mount the brush in your machine on insulated blocks or in electrical contact with the shaft?

A: All metal parts in the machine are grounded. The fabric is mounted on a brass strip. When a charge is developed on the top side there is little conductivity from the top to bottom surface. The surface may then be charged whether the back of the strip is grounded or not.

Q: Supposing a steel brush were used in the place of a fabric brush?

A: It is irrelevant as far as generating the charge is concerned, whether or not a conducting material is in contact with the test fabric causing the charging. If you have an untreated fabric, theoretically most of the charge that is built up in rubbing one piece of test fabric is lost on the aluminum cylinder before the next piece of test fabric comes around. If you had a conductor as a brush, the charge would be lost to the ground. The charge would therefore be developed but would be immediately conducted away.

Q: How does the device measure the conductivity of the treated fabric?

A: The machine does not directly measure conductivity; but the more slowly the charge is lost, the less is the conductivity of the fabric surface. Other measurements of relative conductivity have substantiated this fact.

—♦ ♦—

Consumer Standards—

(Concluded from Page P163)

statement, but have adopted special labels, which are incorporated in the standards.

One such label has been adopted by the Textile Bag Manufacturers Association for a new commercial standard about ready for promulgation: namely, Cotton Flour Bag (Sack) Towels.

Another one has been adopted by the group producing rayon jacquard velour for the commercial standard on Rayon Jacquard Velours (With or Without Other Decorative Yarn), CS103-48.

Commercial standards are not limited to products for domestic consumption but also cover products for export. Standards for export are printed in several languages. As an example, Power Cranes and Shovels (for export), Commercial Standard CS90E-47 was promulgated.

I have outlined briefly some of the administrative powers given to the Department of Agriculture by law over food, drugs and cosmetics. I have mentioned the jurisdiction of the Federal Trade Commission in maintaining fair trade practices in business and particularly in regard to the Wool-Products Labeling Act.

I have indicated the way in which the Department of Commerce works with various industries in the development of informative labeling and in the establishment of standards to that end.

During the second World War when we were being pushed to make the most of our resources, consumer grading was pushed to unbelievable limits, particularly in the United Kingdom. For example, all gasoline was gasoline (or perhaps I should say petrol). There were no brands. Furniture was made to so-called utility standards. It was of the simplest kind and satisfied only minimum essentials. All of these steps, which were applied in many fields, including the field of textiles, went so far that in many ways the development of the industries concerned was definitely retarded. Stated in philosophical terms, the arts of peace were sacrificed to the arts of war. No one would advocate the wide use of consumer standards of this kind except in time of war, and it might even be questionable whether some of the wartime practices were as saving of resources as they might have seemed at first glance.

In any case, modern industry and business have come to recognize to a greater extent than ever before the necessity for telling the consumer just what he is buying. In spite of all the blandishment of much of our system of advertising, it does spread knowledge on a wide scale. Customers are, by and large, aware of the arts of "puffing," as they call it in legal terms, and turn away from overstatements to the more factual materials on which they can depend. Thus, informative labeling takes its place in the system of business. Distributors learn to rely on the manufacturer's statement about his merchandise; they learn to judge quality. But, above all, they learn how to make and form judgments. When a consumer judges for himself, he no longer holds the distributor or the manufacturer responsible for his purchase. The wide knowledge of the product is the important thing. People must learn, particularly in this complicated field of textiles, what is what and why.

Manufacturers of textiles are faced with unusually difficult problems. The invention of new fibers and the problems created by their use call for the widest dissemination of knowledge. They call for knowledge of consumer standards, not in the sense of placing limits on industry, but in the sense of improving its relationship with the consumer. Consumer labeling can be a method of expanding the satisfaction of the consumer with what he gets. This is real wealth production. This is what it is all about. That is why we pay attention to it.

ABSTRACTS

The Effect of Dispersol VL on the Dyeing Properties of Vat Dyes on Viscose Rayon

R W Speke, *J Soc Dyers & Colourists* 66, 569-75, November, 1950.

The high affinity of leuco vat dyes for cellulosic fibers has promoted a considerable amount of research into modifications of, or alternatives to, the traditional dyeing processes, with a view to obtaining results of greater uniformity. Among the many possibilities is the use of dyebath assistants, ambiguously described as leveling, retarding or restraining agents. One of these products is Dispersol VL, an aqueous solution of a fatty alcohol-ethylene oxide condensate, the value of which, as an aid to the production of level and well penetrated dyeings on an industrial scale, has been well proven. In order to facilitate the efficient use of Dispersol VL in practical vat dyeing a detailed study has been made of its effect on the dyeing properties of leuco vat dyes on viscose rayon. This has involved a separate investigation into the three possible functions of a nonionic body as a vat-dyebath assistant, viz—

(1) Restraining effect, i e, the retention of a certain amount of dye permanently in solution;

(2) Retarding effect, i e, reduction in the rate of transfer of dye from solution to fiber;

(3) Leveling effect, i e, a promotion of the rate of migration of absorbed leuco dye from fiber to fiber.

It is shown in this paper that the restraining effect of Dispersol VL upon leuco vat dyes is a function of the *amount* present in the system and not of its concentration in the aqueous solution. A method of assessment of the relative sensitivities of individual leuco vat dyes has been evolved. By this method the relationship between the dyebath exhaustion and the amount of Dispersol VL in the dyebath, obtaining under different dyeing conditions, is experimentally determined. A sensitivity factor is then calculated from the slope of the initially linear graphical relation between these two variables. Evidence is presented to show the influence on restraining effect of varying the depth of shade, the temperature of dyeing, and the salt concentration of the dyebath.

Investigations into the retarding and leveling effects of this nonionic body, as reported in this paper, indicate that these two properties are related to the restraining effect of Dispersol VL upon the leuco vat dyes under consideration.—WHC

New Light on the Peroxide Bleach for Wool

Anon, *Fibres* 11, 396-7, November, 1950.

There are two usual ways in which a peroxide bleach is applied to wool, viz:

(1) The wool is steeped in a bath of dilute hydrogen peroxide in water for some hours.

(2) The wool is given a quick run through a bath of dilute hydrogen peroxide, so that it is immersed for only a matter of ten seconds, is mangled, and then allowed to stand in the wet state for perhaps four hours, or often more conveniently for a day. This method is called the "standing bleach."

So far as results are concerned, there is probably not a great deal to choose between the two methods; either will give an admirable bleach. Hitherto it has not been clear why the "standing bleach" should have given satisfactory results; one might have thought that immersion would have been far better, as there would then always be an adequate concentration of peroxide in contact with the yarn.

Work just published appears to throw some light on this subject. When wool is immersed in an aqueous solution of hydrogen peroxide, there is an immediate fall in the concentration of the peroxide in the bath, which thereafter remains steady; increase of time of immersion does not result in more peroxide being taken up. The hydrogen peroxide that is taken up by the wool is absorbed; it is clear that there is no immediate chemical reaction because the peroxide can be washed out of the fibers by repeated water-washing.

Everything points to the nitrogen-containing groups being the site for absorption of the peroxide. The quantity that is absorbed from concentrated solutions is so great that the free amino groups in wool are insufficient to account for all of it. Evidently the —CONH— amide linkages can also act as sorption sites.

The action of peroxide in a "standing bleach" is therefore explained as follows: wool yarn is passed rapidly through a bath of about 4 vols hydrogen peroxide, mangled out and left to stand for not less than 8 hours. As the wool passes through the bath it immediately absorbs peroxide, but the *immediate* action is physical and not chemical; then during the standing time chemical reaction takes place between the peroxide and the fiber, and this reaction results in the whitening of the fiber. —WHC

Some Problems of Rayon Dyeing. X—Synthetic Fibers

A G Tyler, *British Rayon & Silk J* 27, 68-9, November, 1950.

The synthetic fibers present problems to the dyer; they all have very low moisture regain and as a consequence do not swell to any great extent when immersed in an aqueous dyebath. The most readily dyed is nylon, whose moisture regain is of the order of 4 per cent, while some of the newer fibers (eg, Terylene) have a regain of less than 0.5 per cent and are, therefore, much more difficult to dye.

The normal method of dyeing nylon is by the use of the dispersed type of acetate dyestuffs. The usual method of applying them to nylon is similar to their application to cellulose acetate, except that it is possible to make use of more alkaline dyebaths, as there is no risk of saponification of the fiber. The fastness of these colors when dyed on nylon is as a general rule rather less than when dyed on cellulose acetate. Fastness to light shows the most variation, and varies considerably from one dyestuff to another. On the other hand, the fastness to gas-fading is much better than on acetate; in fact, it is claimed that the risk of trouble from this cause is nonexistent.

The direct dyestuffs have very varied affinity for nylon; in a few cases, as with dyes of the Red F type, the affinity is quite good, whereas many others, as Sky Blue FF, have no affinity whatever when dyed from a neutral bath. The affinity of some direct dyes is increased by the addition of a weak acid to the dyebath. On the other hand, the direct colors have no affinity for nylon in the presence of alkali, even as mild an alkali as soap, so that it is possible to dye cellulose while completely reserving nylon, by keeping the dyebath in a definitely alkaline condition.—WHC

Damage Caused by Nonshrink Treatment of Wool

R W Moncrieff, Textile Mfr 76, 552-8, November; 608-11, December, 1950.

It is very useful to be able to ascertain quickly if a sample of wool, whether in fiber, yarn, or fabric form, has been damaged by the nonshrink treatment that it has received. While it is safe to say that the grosser forms of damage have been eliminated by improved methods of processing, there are still large quantities of wool sold today which have been dam-

aged by chlorination.

Two main kinds of tests, chemical and visual, have been devised which enable the manufacturer to determine whether his wool has been damaged. The oldest chemical test is the one discovered by Pauly, who found that damaged wool reacts with p-phenyldiazonium sulfonate in alkaline solution to give a reddish-brown coloration. No reaction takes place so long as the epithelial scales on the wool fiber are undamaged. Unfortunately the test does not distinguish between chemical and mechanical damage. Pauly's test was later modified by Rimington and again by Edwards, so as to make it more of a quantitative test.

The visual method of estimating fiber damage consists of an examination under the microscope. Fibers are mounted in water and examined at 200-300x. If the scales have been wholly or largely removed, then the fibers are "damaged."

Trotman found that if wool was soaked in a cold acidified solution of Kiton Red G, unchlorinated wool was dyed only slightly, while chlorinated wool took up "quite a lot of dye," and the individual fibers were dyed deepest when the scales had been destroyed or visibly damaged by the chlorination. This test was later modified by Carter and Consden, and is explained in detail.

A photoelectric method of estimating wool damage was developed by Semple, and is described by the author.

Wet chlorination processes involve a loss of wool which may average about 4 per cent of its original weight. Sobue and Hirano have found that wool treated with sodium hypochlorite lost much more weight than wool treated in a solution of calcium hypochlorite having a similar concentration of available chlorine.

Another test for fiber damage, discovered by Burgess, makes use of the pancreatic enzyme trypsin, which disintegrates wool, the rate of disintegration increasing with the amount of initial damage.

The article is instructive and should be read in its entirety.—WHC

Application of Stripping Agents

J M Schandler, *Canadian Textile J* 67, 56, 58, December 22, 1950.

This is a discussion of the practical aspects of stripping with reducing agents, including both hydrosulfite and sulfoxylate-formaldehyde compounds. Sodium hydrosulfite is used in an alkaline bath at 140-160°F. Zinc hydrosulfite is applied in a slightly acid bath at 160-180° F. The sulfoxylate-formaldehydes (sodium, normal zinc and basic zinc) are all used in an acid bath at 180-212° F.

Wool rags are first given an alkaline scour, preferably with the addition of a nonionic detergent, and are stripped with either normal or basic zinc sulfoxylate-formaldehyde at the boil, at a pH of 3.2 to 3.5. The author also refers to the new process for stripping wool, involving the use of ethylene dibromide, which replaces the sulfur linkages in the wool with bromine linkages, making the fibers more stable and resistant to acid and alkaline treatment.

Cottons and rayons dyed with direct or developed colors are stripped with sodium hydrosulfite and caustic soda. Blends of spun rayon and wool or acetate are stripped with normal zinc sulfoxylate-formaldehyde and an organic acid.

The author emphasizes the importance of pH control and the necessity of having the goods as clean and free from extraneous matter as possible.—WHC

NEWS

• No Specific Limit on Textile Machinery Production, NPA Declares

Members of the Textile Machinery Manufacturers Industry Advisory Committee were recently informed at a meeting with the National Production Authority that no measures are being developed at present to specifically limit textile machinery production. NPA's statement followed a recommendation by the committee that their industry be permitted to manufacture textile machinery at the present rate until military and essential civilian textile needs are determined.

The statement follows a recent regulation setting he framework for an all-out allocation of chemicals and allied products by NPA. This order will be a general one under which controls on individual chemicals can be imposed. The action making specific chemicals subject to the order will be called "schedules" which will determine the category in which certain chemicals will be placed and specify how the terms of the general order apply to each. There will be three general categories and the chemicals which come under each will be determined according to the supply and demand situation and not the composition of the chemicals.

NPA has already issued orders providing for the equitable distribution of defense contracts among chlorine and ethyl cellulose producers, but these were not allocations. They merely declared that no manufacturer was required to accept defense orders for more than a certain percentage of his production. 10% of chlorine and 40% of ethyl cellulose are being reserved for military use.

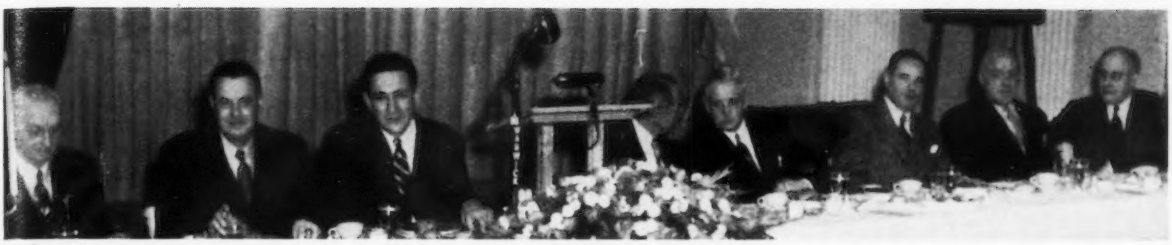
William Beck, deputy director of NPA's Machinery Division, presided at the meeting with the TMMI Advisory Committee. Industry members present included, among others J E Butterworth, H W Butterworth & Sons Co; John P Franklin, David Gessner Co; Earl F Harris, Rodney Hunt Machine Co; D A Colker, National Drying Machinery Co; and James H Hunter, James Hunter Machine Co.

Conversion at this time to other defense production by the machinery producers may result in failure by the textile industry to meet future defense requirements, committee members said. Although the textile machinery industry is relatively small, they pointed out, its products are essential to the important textile industry.

Essentiality of the textile machinery industry is apparent from past history, NPA said, and should it become necessary to partially convert the industry to other defense production, as was done during World War II, ample time will be allowed for orderly conversion.

The industry is experiencing difficulty in obtaining steel, aluminum, and copper, spokesmen indicated, although metal needs for the industry are small. The industry uses 115,000 tons of steel, 3,000 tons of copper and 5,000 tons of aluminum yearly.

NPA explained that although these metals are in tight supply, essential users such as the textile machinery industry, will be given spot assistance in obtaining supplies whenever possible.



Seated at the Dais, PTI Alumni 50th Anniversary Banquet

L to R—Rinaldo A Lukens, President of PTI; Rep Hugh D Scott, Jr; Howard P Galloway, Alumni President; Harry Pope; Theodore B Hayward, Chairman of the Board of Trustees; R Sidney Flood, President of the (PTI) New York Alumni Club; Frank P Zurn, Chairman of the Board of Governors; and Richard S Cox, Dean. Bertrand W Hayward, Director, was not seated when photo was taken.

• PTI Golden Anniversary Banquet Attracts Over 300

The 50th Annual Banquet of the Alumni Association of the Philadelphia Textile Institute recently attracted over 300 alumni and guests to Philadelphia's Warwick Hotel with a well-rounded program, featuring guest speakers Hugh D Scott, Jr and Harry Pope. Congressman Scott, a representative of the Sixth District of Pennsylvania and former National Chairman of the Republican Party, recently completed a tour of duty in Korea as a commander in the U S Navy. Mr Pope, popular humorist who was making his second consecutive appearance at the affair, spoke on his "Cafeteria of Ideas."

Music by Howard Lanin and orchestra with vocalist Ethel Rider was provided throughout the cocktail and dinner periods.

Howard P Galloway, President of the PTI Alumni Association, acted as toastmaster. The committee in charge of the banquet included E Haack, W Popp, K Booth and J J Collins.

• William Carter Co Doubles Size of Forsythe Mill

The program of construction for The William Carter Company to double the facilities of its operations in Forsyth, Georgia, scheduled for completion late last month, and the addition of new equipment will necessitate the hiring of approximately twice the number of workers now employed, according to an announcement by William H Carter, President.

Carter's Forsyth mill is under the supervision of C E Walker, superintendent of Carter's Barnesville mill approximately fifteen miles distant. At Barnesville, in 1950, the company doubled the size of its wash and bleach house to handle the increased volume of cloth, and also enlarged the mill's testing laboratory.

For the past year, the 86-year old underwear concern, whose home office is located in Needham Heights, Massachusetts, has conducted an extensive schedule of improvement of its mills and sales offices. Last June, work was completed on the rebuilding of the south wing of the home office. The improvement included eight new administrative offices. In addition, a new building containing 35,000 square feet of floor space was added to provide for an enlarged shipping room and storage warehouse.

Late in the year work was begun on the company's mill in Springfield, Massachusetts, and it is expected that reconstruction will be completed by April of this year. Plans include improved sanitary accommodations, new designers' rooms, an enlarged receiving area and a new loading platform, as well as new elevator facilities.

In November, a new ultra-modern sales showroom covering an area of more than 3,500 square feet and providing for a large salon for fashion showings, individual showrooms for specific lines of merchandise and administrative offices was opened on the twenty-third floor of 100 Park Avenue, New York.

• Dyestuff Industry Advisory Committee to Be Named

Charles C Concannon of the National Production Authority's Chemical Division revealed at a recent SOCMA meeting that an official Dyestuff Industry Advisory Committee is to be named shortly. Mr Concannon is now submitting nominations representing various levels of industry for approval. The announcement followed his remarks pertaining to the formation of the chemical advisory committee for the NPA.

• ASA Approves Open-Surface Tanks Code

To protect workmen from escaping gas, vapor, or mist involved in open-surface tank operations, the American Standard Safety Code for Open-Surface Tanks (Z9.1-1951) has been approved and published by the American Standards Association, 70 E 45th St, New York 17, N Y.

Operations involving the immersion of materials in liquids and their subsequent removal are covered in this code, including washing, anodizing, quenching, dyeing, dipping, bleaching, degreasing, alkaline cleaning, stripping, and rinsing.

The standard classifies open-surface tank operations into twelve classes depending upon the relative need for controlling the gas, vapor or mist rising from the tank. Tables are included to allow classification of any open-tank operation from a knowledge of the tank temperature; the boiling point, flash point and relative evaporation rate of the liquid in the tank; the maximum allowable concentration in the air of the vapor or mist produced; and the extent that the operation produces mist. Ventilation requirements vary with the need for control as indicated by the classification of the operation.

The standard stipulates for each "class" a minimum control velocity for enclosing hoods with one or two open sides; for canopy hoods with three or four open sides; and for lateral exhaust with no hood over the tank. The procedure is also outlined for computing the ventilation rate (in cubic feet of air per minute) required to maintain the necessary control velocity for each hood type and includes a number of examples of these computations.

Rules on personal protection are included as well as rules on operation; inspection; maintenance and installation; special precautions for cyanide; and vapor degreasing tanks. Provision is made to allow the use of both control means other than ventilation, and methods of ventilation involving supplied as well as exhausted air. When an operation has both a low hazard potential and a low rate of gas, vapor or mist evolution, general room ventilation by either natural or mechanical means is considered safe and acceptable as the control means.

The appendix at the back of the code includes tables of the resistance to corrosion of materials used for hoods, ducts and exhaust fans, as well as seven pages of typical exhaust hood designs.

• Piece Goods Dyeing By Hot Oil Process

Development of an entirely new process for the dyeing of piece goods has been announced by J Robert Bonnar, technical director of the General Dyestuff Corporation. The method, utilizing the Williams units is recommended by GDC for dyeing vat and sulfur colors as well as other types of dyestuffs. Compared to the standard method of dyeing in Williams machines, the new method is said to have the following advantages:

1) More economical handling of short runs
2) Better shading
3) Better appearance of dyed material, particularly on low count constructions
4) Greater stability of dyestuffs, particularly in the Indanthrene Blue BCS class
5) Time of development decreased, eliminating the necessity to use two Williams units, rather than one for reduction and fixation of vat colors and sulfur colors

Vat colors are applied by padding, drying the material in a hot flue, passing the cloth through one Williams unit containing caustic soda and hydrosulfite and then into a Williams unit containing a white mineral oil at 215°F. The oil absorbed by the cloth is removed by passage through the next unit containing Igepal CA, 5-8 lbs per 100 gallons of water at 70-80°F. This treatment is said to emulsify the oil completely, and is readily removed from the fabric. The usual finishing operations such as oxidizing, soaping and rinsing follow.

Initial trials are said to have indicated that the drying operation after pigment padding of vat dyestuffs may be eliminated particularly for light shades on lightweight constructions.

Sulfur colors are applied at 200-212°F from a reduced bath in a two or three roll pad. The fabric is then passed directly into a Williams unit containing white mineral oil at 225°F. The oil is then removed by passage through a cold bath containing Igepal CA. The usual finishing operations follow.

The new process is reported to have been used successfully on runs up to 40,000 yards. Patents have been applied for.

• Pure Drug & Chemical Corporation Formed

The Pure Drug & Chemical Corporation, a subsidiary of United Dye & Chemical Corporation, has been formed in New York to engage in the manufacture and wholesale distribution of chemicals and drugs. Executive offices are at 285 Madison Avenue. Part of the facilities of the American Dyewood Co, Chester, Pa, will be used by the new company, it is reported.

Officers include Malcolm W Armstrong, president; H James Mugford, vice president and Fred Fuller, secretary and treasurer. David S Fischman, president of United Dye & Chemical, is chairman of the board of directors. Other members of the board are Robert H Bailey, chairman of the board of United Dye & Chemical Corp and American Dyewood Co; Howard E Phillips and Alexander E Joffe.

• Fabric Research Provides Course for LTI Students

A unique course in the study of wood technology and paper microscopy has been set up for students of the Lowell Textile Institute at the Fabric Research Laboratories, Boston, Mass. FRL provides the instructor, space and equipment for the course, which meets three hours a week for lectures, demonstrations and laboratory work, covering the college year.

The course covers sources of papermaking fibers, the flow of raw materials from forests into paper, microscopic identification of fibers, fillers, sizings, coatings and the relationship of the structure of papers to proper selection for end use, according to Horace N Lee, Fabric Research Laboratories staff member who is serving as instructor. Mr. Lee, who studied at the University of Maine and Harvard, was four years head of the timber physics section of Forest Products Laboratory of Canada and for 12 years served Hammermill Paper Mills as wood technologist and microscopist. For the past eight years he has been the FRL chief microscopist.

Shortly after Lowell Textile announced the opening of its new paper department in 1949, FRL opened a paper section to offer to the paper industry the same kind of consulting research service which it has been giving the textile, plastics and chemical industries since 1941. Dr Geoffrey Broughton, head of the paper division at Lowell, was appointed head of the new Fabric Research Laboratories paper section.

Dr. Walter J Hamburger, director of FRL, stated that "with the coming of Dr Broughton we have equipped a modern pulp and paper research laboratory to augment the complete microscopic section under Mr Lee. Over the years, many of the specialized instruments developed at FRL for the study of fibrous materials have become increasingly valuable in the study of paper problems. Now that all these facilities have been formally organized under Dr Broughton's direction, it seemed only natural to extend the traditionally close relationship between Lowell Textile and FRL to include this course for students in the paper curriculum."

• Emery Industries Establishes West Coast Branch Office

Emery Industries, Inc has located a new branch office at 420 Market St, Tilden Sales Building, San Francisco, California to give direct sales and technical service to the West Coast area. L J Hadobas will handle this coverage.

• Chemstrand Names Contractor

Daniel Construction Company of Alabama, Inc, Birmingham, has been named general contractor for the Chemstrand Corporation's multi-million dollar plant for production of synthetic fibers at Decatur, Ala. Osborne Bezanson, president of the corporation (owned jointly by Monsanto Chemical Co and American Viscose Corp), has stated that construction will begin immediately at the 656-acre site. Manufacturing units, laboratories and general offices, as well as a power house and other service facilities, will be erected at the location adjacent to the Tennessee River. The plant will employ approximately 500 persons, it is stated.

Chemstrand acrylic fiber is currently being produced at a pilot plant at Marcus Hook, Pa. In its initial stage, the new wool-like synthetic fiber reportedly will be manufactured in staple form only.

• Morningstar, Nicol Inc Celebrates 100th Year

Morningstar, Nicol, Inc, a leader in the potato starch and dextrine field, celebrates its hundredth year of service to the industry this year. Organized in 1851 by Charles Morningstar, the company is said to be the first commercial manufacturer of starch. Plants are currently maintained at Houlton and Mars Hill, Maine, Twin Falls, Idaho and North Hawthorne, N J, with the main offices at 630 W 51st Street, New York 19, N Y. A subsidiary, Paisley Products Inc, New York, manufactures textile oils, softeners, sizing and finishing specialties.

• Recorder Features Adjustable Range, Adjustable Zero Suppression

A new Speedomax electronic recorder announced by Leeds & Northrup Company, 4934 Stenton Ave, Philadelphia 44, Pa, features a range continuously adjustable over a 20:1 ratio, and zero suppression adjustable over more than twice the maximum range.

Through use of a particular suppressed zero range, it is reported that an operator can ignore that portion of the range in which he is not interested, while he spreads the few millivolts he wants to watch across the entire width of the instrument chart. Adjustable range is said to permit the user to select his own scale calibration at will.

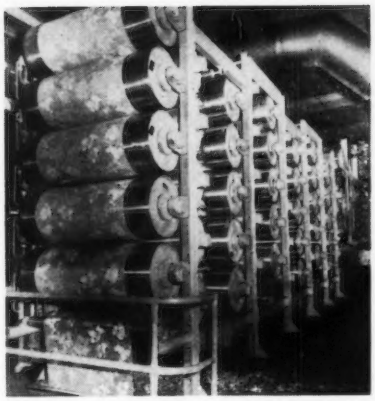
Some typical measurements include:

(1) *Measurements with strain gages*—for experimental stress analysis, weighing operations, etc. Adjustable zero compensates for tare weight; range can be adjusted to provide the desired scale calibration.

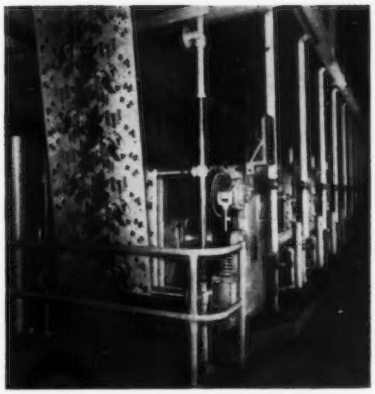
(2) *Temperature difference measurements with thermocouples*—in measuring small temperature changes at elevated temperatures.

(3) *Speed measurements*—Using an electric tachometer as the primary element, this recorder is recommended by its manufacturer for measuring change of speed over a narrow range, or assisting in the study of speed regulation characteristics of motors, engine governors, etc.

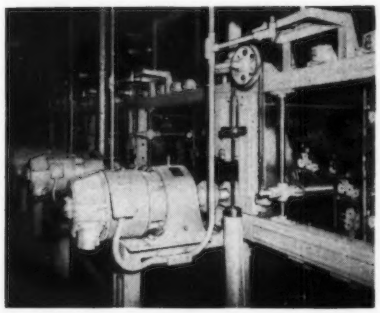
Calibrated d-c millivoltage range is adjustable from a minimum across-chart span of 1.1 mv to a maximum range span of 22 mv. Uncalibrated coarse and fine rheostats reportedly provide maximum zero suppression of —50 or +50 mv, continuously and independently adjustable between these limits. Range remains constant during zero adjustment and zero suppression remains constant during range adjustment, the company states.



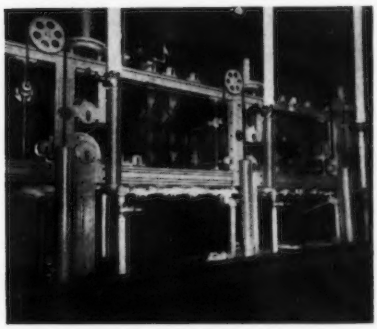
Unistel Drying Unit.



Delivery End with Heavy Duty Pneumatic Squeeze Rolls.



Individual Motor Drives and Compensating Rolls.



View showing accessibility of tanks and operating members and separate frames for idler roll support.

Four Views of the new Hunter Compartment Washer

• New Compartment Type Open Soaper or Washer

The James Hunter Machine Company, North Adams, Mass has added a new compartment type open soaper or washer to its line. The new machine, developed in conjunction with the United States Finishing Company, Norwich, Conn, has been installed for the last six months by the latter along with high-pressure cans as part of a complete plant equipment modernization program. At the time of installation, the mill management hoped to increase the productive efficiency of their soaping range approximately 50%. After six months they claim a 100% increase and are running the machine from 90-125 ypm on a complete range varying from 80-square percale to 118 dobby.

When the machine is being run for soaping after aging or developing and oxidizing the colors used in the printing process, the first two bowls are filled with chrome acidic oxidizing bath to perform the initial function of developing. Afterwards come two water rinses, then four soap bowls and two final rinse bowls. The temperature of the water is approximately 180° in all bowls. Water flow as well as addition of acid and soap reportedly can be entirely automatic. When the machine is being used for scouring rather than soaping, seven to eight bowls are used for soap and soda, and two to three bowls for rinse bowls.

The cloth is fed to the machine through a set of Mecco guides and draw rolls to the first bowl. It progresses through vertical passes over stainless steel top and bottom idler rolls, then over a curved rubber expander to the main nip rolls, which can be furnished with either three or five-ton pressure. The bottom roll is of centrifugally cast stainless steel, and the top roll is rubber covered to a required density. These main squeeze rolls, as well as the idler rolls, are reported to be rigidly supported in a rugged cast iron frame entirely independent from the stainless steel bowl. Both top and bottom bearings of the squeeze rolls are so designed that either roll may be removed separately. The bottom idler rolls are held independently of the stainless steel bowl, and no part or parts requiring alignment are attached to the tub itself. The tanks are fabricated from type #316 SMO stainless steel, and all corners and bottoms are rounded for ease in cleaning. A skimmer trough is furnished in each tank to clear away sludge or other foreign matter removed from the cloth. The bottom idler rolls in the first two compartments are solid stainless steel tubes, and in the balance of the machine are specially constructed reels made from six ⅝" diameter stainless steel rods. These serve to agitate the cloth, loosen gums and increase the scouring efficiency.

Pressure on the main rolls is supplied through Stabiliflo motors, the control for which is located in the casting which supports the main roll bearings. The final squeeze is accomplished through a heavy set of Hunter Model G Pneumatically controlled 18" diameter Squeeze Rolls, operating from 10-15 tons pressure. The cloth then goes through a compensating gate and is delivered to a set of 40 Unistel dry cans, 23" in diameter, and operating under 35-50 pounds pressure. These are manufactured by the Unistel Textile Corporation of Port Chester, New York.

• New GDC Dyestuffs and Assistants

The following are reviews of five late General Dyestuff Corporation products. Company bulletins on each are available.

Celliton Blue BB Extra Conc CF—a straight, dispersed dyestuff used for dyeing bright, dark-blue shades of very good tinctorial value on both acetate (estron) and nylon. A property of this blue that distinguishes it from other bright Celliton blues, except Celliton Blue GA Extra CF, is that it does not turn redder in artificial light. This property is said to be evident not only in self colors but also in compound shades, such as dark greens and browns, which likewise maintain their tone in artificial light. Ability to dye well at either low or high temperatures enables this product to be applied well on reels, in jigs and in any other dyeing equipment, the company states.

For the production of similar shades in printing, GDC recommends the chemically identical Celliton Blue BB Extra Conc CF for Printing manufactured especially for textile printing.

With the exception of fastness to atmospheric fading and to chlorine, the fastness properties of Celliton Blue BB Extra Conc CF are said to be essentially the same on acetate and nylon. Although full shades exhibit good(5) fastness to light, weak shades possess only fairly good(4) fastness and thus are recommended only for textiles where commercial fastness suffices. Excellent(5) fastness to hot pressing and excellent(5) fastness to dry cleaning are more important for fabrics that are usually dry-cleaned than is fastness to washing, which is fair(2) for this blue. The fastness to atmospheric gas fading of this color on acetate, as usual for bright Celliton blues, is poor(1); but on nylon the Celliton dyestuffs reportedly are not subject to gas fading. The fastness of dyeings of this product to sublimation is reported excellent(5) on both acetate and nylon.

* * *

Rhodamine B Extra S — a versatile straight basic dyestuff of great brightness of shade, of high tinctorial value and of considerable fluorescence. The product is said to be generally applicable by either dyeing or printing methods to silk, wool, nylon, acetate, rayon or cotton for the production of bright red, pink or red-violet shades according to the particular application. These shades are valuable where brilliance is more important than fastness. It is stated, however, that this product is among the fastest of the basic dyestuffs in resistance to light.

Glyecine A — a straight, water-free liquid printing assistant with properties quite similar to those of glycerine and diethylene glycol but reportedly much superior in solvent and penetrative powers.

Chemically, Glyecine A is a wholly synthetic, clear and nearly colorless, neutral, water-miscible (water-soluble in all proportions), hygroscopic, polyethylene glycol derivative with a specific gravity of 1.18 (9.85 lb per gallon). It is reported to be unaffected by the ordinary acids (with the exception of conc HCl above 140°F), alkalies, reducing agents and other ingredients of printing pastes.

* * *

Fastusol Brown 3RL-CF—a straight addition to the company's line of Fastusol type dyestuffs. It is recommended by the manufacturers primarily for dyeing cotton, rayon and other cellulosic fibers, on which it reportedly produces bright, very reddish shades of brown with very good(6) fastness to light for medium shades on cotton and maximum(8) fastness on rayon. A particular advantage over other fast-to-light browns of similar shade is that this new brown is relatively as fast in the Fade-Ometer as in sunlight. Its lightfastness is virtually unaffected by aftertreatment with urea-formaldehyde resin for crease resistance and is only slightly affected by aftertreatment with melamine-formaldehyde resin for the same purpose, it is reported. Resin aftertreatment slightly improves wet fastness and the fastness to washing and other wet fastness properties of dyeings of this product are appreciably improved by aftertreatment with formaldehyde and acetic acid, the ratings for fastness to washing on cotton being improved from poor-to-fair(1-2) to fair-to-good(2-3) and the fastness to washing on rayon from fair-to-good(2-3) to good(3).

Dyeings on this brown are said to be valuable for discharge work(3-4), light shades being dischargeable to a good white and dyeings of all depths being suitable for colored discharge effects. When dyed in full shades in the presence of effect threads, Fastusol Brown 3RL-CF stains estron (acetate) only slightly(4) but it stains wool heavily(2), it is reported.

The bright, strong, reddish-brown shades produced with this product, which has very good(4) fastness to perspiration and to resin finishes, are said to be especially suitable for rayon dress goods. Its ability to dye mercerized cotton and rayon tone-in-tone and its adequate wet fastness make it also of interest for the production of economical shades on mercerized cotton and rayon hosiery. Estron (acetate) effect threads in fancy hosiery are stained only slightly in full shades and are left practically clean in medium or light shades, it is stated. Where excellent fastness to washing is not required, GDC reports that Fastusol Brown 3RL-CF can be advantageously employed for such articles as decorative rayon upholstery braids and rayon curtain materials for the very best fastness to light, or even on similar cotton materials for very good light fastness.

The product is a nondusting powder, which dissolves to the extent of 9 oz per gallon at 120°F. Although this brown does not relevel readily in application, nevertheless it reportedly dyes at only a medium rate at 150°F and is not so sensitive to small additions of salt as many fast-to-light direct colors; yet at the same time very good exhaustion is attained by the use of reasonable amounts of salt. Its applicability in all types of dyeing equipment to yarn and piece goods and to stock and yarn in circulating machines is attested by the manufacturer, as is its use on textiles that are to be rubberized.

* * *

Igepal CA Extra High Conc—a 100% active liquid surface-active agent said to have outstanding detergent, wetting, emulsifying and dispersing properties.

* * *

The bulletin titles and numbers of the above products follow:

G-659—Igepal CA Extra High Conc
G-660—Fastusol Brown 3RL-CF
G-662—Celliton Blue BB Extra Conc CF
G-670—Rhodamine B Extra S
G-672—Glyecine A

OBITUARY

ROBERT CROOKS STANLEY

ROBERT CROOKS STANLEY, Chairman of the Board of Directors of the International Nickel Company of Canada, Limited, died on February 12 at his home in Staten Island, New York. Mr Stanley was one of the outstanding leaders in the nickel industry, beginning his long association with a predecessor company of International Nickel. Among his numerous outstanding achievements in the mining and metallurgical field was his discovery in 1905 of Monel, a white alloy of nickel and copper, as well as the development of a process for producing it direct from ore without separation of the component elements.

Mr Stanley, continuing as President of International Nickel, assumed the Chairmanship of the Company's Board of Directors upon the death of Charles Hayden in 1937. On February 7, 1949, he relinquished the Presidency, remaining Chairman of the Board.

Eugene W Wall

EUGENE W WALL

EUGENE W WALL, assistant treasurer and chemical director of the Kali Manufacturing Company, Philadelphia, died January 29 at the Abington Memorial Hospital at the age of 56. Mr. Wall, who was a member of the AATCC Committee on "Analytical Methods for a Textile Laboratory," was for a number of years editor of "The Catalyst"—official organ of the Philadelphia Section of the American Chemical Society.

Following his graduation from the University of Pennsylvania in 1916, he went with the General Chemical Company. He became general works manager of the Heyden Chemical Company in 1919, after which he joined Kali as Director of Laboratories in 1922. His election to the post of assistant treasurer took place in 1941.

A lecturer and writer on various technical subjects, Mr Wall did some of the original research work on cold light and the application of fluorescent colors to textiles.

PERSONNEL

EDWARD W GAMBLE, JR has been appointed local representative in charge of Monsanto Chemical Co's office in Washington.

HERBERT W YEAGLEY, who has been local representative since 1949, has been granted a leave of absence to attend Harvard University Graduate School of Business Administration. After completing his studies, he will be assigned to the company's organic chemicals division at St Louis.

It has been announced that J R GLATTHAAR of the organic chemicals division at St Louis has been assigned as technical representative to assist Mr. Gamble.

The technical staff of Chemical & Industrial Laboratories, Inc, Greenville, S C, has a new member in RICHARD E RETTEW, formerly with Sandoz Chemical Works, Inc. Mr Rettew will continue to live in Charlotte, N C, and will call on plants in the Carolina-Virginia area.

Several appointments, constituting the basic merchandising personnel of the newly formed Alexander Smith Products Company, which functions as a division of Alexander Smith & Sons Carpet Company in the development and marketing of new products and processes outside the normal activities of floor coverings, have been announced by Frank H Higgins, president.

PAUL GARST, formerly contract manager for the carpet company, will become manager of the textile division of Alexander Smith Products Company. During World War II, Mr Garst handled Alexander Smith's government contracts for blankets and duck, and it is expected that for the present emergency at least, he will concentrate his efforts along the same lines.

DR ERNST WOLFF will assume the position of manager of the industrial processes division. Prior to joining Alexander Smith, he was chemical director of Native Laces and Textiles, Inc.

Other appointments to division managerships include GEORGE VALLENDER (Fibre Web Division), JOHN W CLARKE (Special Products Division), and JOHN HOBSON (Sloane-Blabon Industrial Sales Division). Mr Hobson was formerly assistant purchasing agent for Sloane-Blabon, a subsidiary of Alexander Smith & Sons Carpet Company.

DR RICHARD S COX, Dean of the Philadelphia Textile Institute, has been elected a Fellow of The Textile Institute, Manchester, England. Dr Cox has served in the post of dean at PTI since 1943. He was elected President of the National Council of Textile School Deans in 1949.

Dr R S Cox

John F Synan

JOHN F SYNAN has been appointed manager of the product development department of Mathieson Chemical Corporation. He will report to Dr George P Vincent, director of product development. Mr Synan, who has been with Mathieson since 1939, is noted for his developments involving Textone, a sodium chlorite product.

Four personnel changes in three divisions of the Rayon Department have been announced by E I du Pont de Nemours & Company.

DR EDWARD F WESP, director of the Viscose Rayon Research Section, has been made assistant manager of the Planning Division, succeeding W SAMUEL CARPENTER, III, who recently returned to the Rayon Division as assistant director of production.

DR E A TIPPETTS, assistant director of the Viscose Rayon Research Section, becomes director.

HENRY C FROEHLING, manager of development and promotion of Orlon acrylic fiber and Acele acetate rayon, has been named assistant director of sales of the Acetate Division in charge of sales promotion and development and fabric development. LEONARD A YERKES, JR, is also an assistant director of sales of the Acetate Division. He will continue in charge of the sale and distribution of Orlon and acetate rayon fibers.

WALTER R HEED, who has been working on the sales promotion of Orlon for the last year, has been made manager of the Sales Promotion Section of the Acetate Division.

The Plastics and Resins Division of American Cyanamid Company has announced that N C MARTIN has been assigned to act as a consultant to firms requiring technical assistance in the production of weather-proof bag seams and weather-proof solid and corrugated fiber board.

Appointment of E E KIMMEL as Technical Advisor for the Chemical Division of Koppers Company, Inc., has been announced by Dan M Rugg, Vice President and General Manager. In his new position Mr. Kimmel will be responsible for coordination of all technical matters relating to the development, sale, and use of products presently produced or contemplated for production by the Division.

Before joining Koppers as assistant to the Technical Advisor for the Chemical Division in 1949, Mr Kimmel was manager of the research laboratory for coal chemicals and synthetic resins of the Interlake Chemical Corporation.

WILLIAM R IVEY, JR, former overseer of the bleach house of the North Carolina Finishing Co, has joined Tennessee Eastman at Kingsport, Tenn.

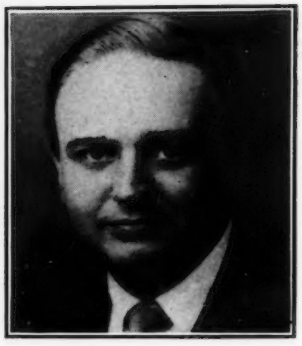
ANDREW E COLLINS has been appointed technical advisor to the finishing operations of Reeves Bros, Inc, it is made known by John M Reeves, president.

Mr Collins was for the past 10 years general manager and treasurer of Empire Piece Dye Works, Paterson, N J, until its recent sale and was with that firm 28 years.

ROBERT EDWARD STEVENSON, formerly with the technical service department of the National Cotton Council of America, was appointed January 1, 1951, as textile technologist in the Washington office of the U S Department of Agriculture's Bureau of Agricultural and Industrial Chemistry. Mr Stevenson will work under the direction of DR WALTER M SCOTT, assistant chief of the Bureau, in planning and coordinating investigations at the four Regional Research Laboratories on new and wider uses for cotton and other fiber crops, development of synthetic fibers from agricultural materials, and utilization of straw and other agricultural residues.

An explosion at Metro Dyestuffs Corp, Coventry, R I injured 10 men last month, including H W GRIMMEL, dyestuffs chemist and plant manager. Three workmen were critically burned with the explosion of a chemical vat, believed to have been caused by acetate fumes. A flash fire followed the explosion.

The Salesmen's Association of the Textile Dyeing & Printing Industry, Inc recently honored AL SCHROEDER of the Jersey Dyeing Corp with a gift for his 20 years as treasurer of the association.



Paul F Haddock

PAUL F HADDOCK has joined Sandoz Chemical Works, Inc to serve as Supervisor of Sales of Chemicals and Textile Aids for the company's Charlotte, N C office. Mr Haddock, a native of Charlotte, had previously served American Cyanamid Company in the South for 13 years.

STANLEY OSBORNE, vice-president and treasurer of the Mathieson Chemical Corp, has been appointed financial vice-president. He will supervise the treasury and administrative departments of the company. WILLARD G ROUSE has been named treasurer.

TECHNICAL LITERATURE

Chemistry of Acrylonitrile—96 pages, Industrial Chemicals Division, American Cyanamid Company. This new book, said to be the first major piece published on acrylonitrile and its applications, discusses its synthesis, physical characteristics and chemical properties. It also summarizes the present and potential applications of the compound.

An exceptionally versatile and valuable chemical intermediate, acrylonitrile (or vinyl cyanide) was discovered by Moureu in 1893. He showed it to be the nitrile of acrylic acid, having the structure: $CH_2 = CH\text{-}CN$. From 1893 almost until the outbreak of World War II, the compound remained a laboratory curiosity. The discovery that valuable synthetic rubber could be prepared by the copolymerization of acrylonitrile with butadiene led to the development of large scale production both in the United States and Germany, in the late 1930's. In the years following the war, American Cyanamid Company has continued to offer a compound in commercial quantities.

Notable among the present applications of acrylonitrile is its use in Buna-N synthetic rubber. When used in this instance, its characteristics include high resistance to the swelling action of solvents, oil and greases, and to heat, aging and sunlight.

Of perhaps more importance today, is acrylonitrile's use in the production of certain synthetic fibers. The outstanding physical properties together with moderate cost should enable these fibers to find wide application. In the form of staple fibers, the vinyl chloride-acrylonitrile copolymer is said to have many advantages over wool. Such fibers are reported as being characterized by good strength and resiliency, warmth, dyeability, and resistance to combustion. They are said to be unattacked by moths or mildew, nonshrinkable, and resistant to solvents, acids and alkalis. Polyacrylonitrile fibers are characterized by resistance to sunlight and to outdoor exposure in general.

* * *

Chemical Process and Plant Engineering (Bulletin X-1)—R S Aries & Associates, 400 Madison Ave, New York 17, N Y—a bulletin covering the company's engineering services in preliminary economic evaluation; process design; plant location, design, and construction; purchasing and expediting equipment; and initial plant operation. Available on request.

*Superclean**—Charles W Berg Laboratories, 1827-29 N Fifth Street, Philadelphia 22, Pa—a booklet giving characteristics and properties of the detergent "Superclean." Emulsification properties and use of the product in the fulling mill in conjunction with soap, its use in stock dyeing, and its addition to improve spinning oils are discussed.

Charles Berg Laboratories has also released a circular giving thumbnail characteristics of nine other products in addition to Superclean. These include: tar remover, Pearsol, Evenshade, Nylon scour BL, Pinesol, Riddal, Softex, Lightning penetrant and Single end compound.

---

* reg trade mark #311,023

* * *

Water-conditioning equipment (ionXchange) is described in 8-page folder available from the Illinois Water Treatment Company, Rockford, Illinois. Information covers ionXchange equipment including softeners, hydrogen zeolite, de-Ionizers and the newly developed Illco-Way Mixed-Bed De-Ionizer. The bulletin includes specifications on Illco-Way "package-type" units available for flow rates up to 1,000 gallons per hour.

SANDOZ PRESENTS *The color achievement of the month*

Cloud Grey ...BY MOHAWK

That most fleeting of substances — the cloud — belies its own tendency when representing one of the high-fashion colors used for Mohawk's Grosvenor pattern.

For colors such as Cloud Grey, Mohawk Carpet Mills, Inc., demands utmost resistance to fading. And that is why Mohawk includes Sandoz among its suppliers.

Such Sandoz colors as the following are widely used by carpet mills because they are exceptionally level-dyeing even in light shades, highly resistant to color change during mill processing, and as impervious to light, wear and cleaning as ever a color could be:

BRILLIANT ALIZARINE LIGHT BLUE 3F

XYLENE FAST RED 6BL

XYLENE FAST RUBINE 3GP

XYLENE LIGHT YELLOW 3G

And for *any* chrome, acid or direct dyes . . . or auxiliary chemicals . . . for both natural and synthetic fibres . . . be guided by the successful "color achievements" you see in these Sandoz advertisements.

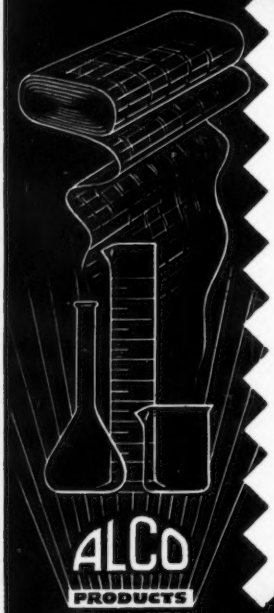
DIRECT-DYE COTTON AND RAYON WITH CONFIDENCE IN WASH FASTNESS!

New Sandoz CUPROFIX colors and after-treatment give fastness to washing, light, etc., that formerly required more expensive vat dyeing. Write for booklet on CUPROFIX, already adopted by dozens of mills.

SANDOZ CHEMICAL WORKS, INC., 61 VAN DAM STREET, NEW YORK 13, N.Y.

Application laboratories and stocks at Boston, Philadelphia, Charlotte, Chicago, Los Angeles, Toronto • Other branches at Providence, Paterson and Montreal

SANDOZ *thinks ahead with textiles*



VULCANOL*

A Group of Latex Compounds for Sizing, Coating and Impregnating Textile Fabrics.

ALCOGUM

Synthetic Thickeners for Latex Compounds.

VULCARITE

Dispersions of Latex Compounding Chemicals.

* * *

Technical information and samples available promptly upon request.

* Registered Trademark

ALCO OIL & CHEMICAL CORPORATION

TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

SOUTHERN DISTRIBUTORS

WICA COMPANY INC.

CHARLOTTE, N.C.

Typical Analysis of BARIUM'S

SODIUM SULPHIDE FLAKES

Fe	0.0005%
Other Heavy Metals	Nil
NaCl	0.40
Other Na_2O (not oxidizable)	1.35
Na_2S	61.00

Manufactured in Large Tonnage by . . .

BARIUM REDUCTION CORPORATION

SOUTH CHARLESTON 3, WEST VIRGINIA

KELTEX

THE MODERN PRINT PASTE THICKENER

promotes pleasing patterns

ON tie MATERIALS

printed with acid, direct and acetate colors on acetate, viscose, wool and pure silk goods

When you use Keltex as your thickening agent you get definite advantages that contribute to superior printing, easy handling and economy of use.

...No cooking or special treatment
...No filtering—free from grit and cellulose
...Readily soluble in cold water
...Easily washed out after printing
...Exact and uniform printing paste viscosity
...Sharp, clean-edged printing
...True, even color yield
...Maximum color penetration
...Ease and economy of use
...Equally effective in machine or screen printing

For detailed information write to our nearest regional office.

KELTEX REFINED ALGIN PRODUCT

KELTEX®

...a product of **KELCO COMPANY**

20 N. Wacker Drive
CHICAGO 6

31 Nassau Street
NEW YORK 5

530 W. Sixth Street
LOS ANGELES 14

Cable Address: Kelcoalgin — New York

DYESTUFFS
BICK & CO., INC.
READING, PA.
CHEMICALS

"Metalsmiths" Stainless Steel and Monel Utensils

Everything you need for corrosion-resistant service

Efficiently designed and durably built to serve the needs of textile processing. In addition to the items shown, are beakers, batch cans, stock pots and shovels. Many items in stock for prompt shipment. Buy and try "Metalsmiths" utensils—compare the value.

WRITE FOR LATEST CATALOG — PRICE LIST

METALSMITHS

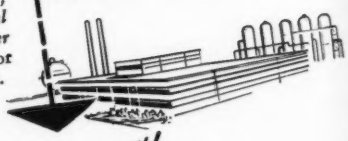
Division of **Orange Roller Bearing Co., Inc.**

562 White Street Orange, N. J.

CONTROL CORROSION in Bleacheries & Dye Houses

Where Acids or Alkalies Destroy Prufcoat PROTECTS

In plants which actually manufacture the acids and alkalies you use, Prufcoat has been providing positive protection against costly corrosion for over 10 years now . . . *on concrete floors, walls, ceilings, structural steel, tanks and other equipment.* Write for Prufcoat literature.



NEW!

PRUFCOAT METAL-REACTIVE PRIMER P-10

Does not require as complete surface cleaning as most other priming methods and works well on damp or dry surfaces. Write today for Prufcoat Technical Bulletin 012.

Prufcoat Laboratories, Inc.
50 East 42nd Street
New York 17, N.Y.

Preventive Maintenance PAYS!

• *"you name it... I helped make it!"*

Glue for disposable dishware

Why nary a drip as I sip? Glue! Moisture-resistant glue. That seals in ice cream sodas, steaming coffee, milk. In cups, containers and straws. Glue that must be non-toxic, colorless, odorless. That provides a high-speed bond that's as strong as the toughest paper; as flexible as the thinnest. Unusual? Not in the least!

• *"you name it . . . I helped make it!"* Look around a drug-store. There isn't a single item that doesn't require at least one, and sometimes eight types of glue in its making, labeling, packaging, shipping. The NATIONAL touch is everywhere. Glue applied through imaginative research and service. To every item of daily life.

STARCHES **National** ADHESIVES

National Starch Products Inc.

Executive Offices: 270 Madison Ave., New York 16, N. Y. • *Plants:* Dunellen, N. J., Chicago, Indianapolis, San Francisco. • *Sales Offices:* All principal cities. • *Canada:* Toronto and Montreal. • *England:* Slough. • *Holland:* Veendam.

At Last! the Spun Rayon Sizing you've always wanted

NON-CONGEALING QUICKER RINSABILITY

You asked for a starch with exceptional running qualities. For sizing spun rayon yarns. It's ready. NU-FILM is a new type of starch. Non-congealing. Won't jell in size box or feed line. Offers additional advantages never before combined in a single starch:

NU-FILM practically eliminates hard size . . . retards the formation of set marks . . . and reduces rayon 'seconds'. You can count on improved weaving efficiency soon after applying NU-FILM to your slashing operation.

NU-FILM is removed from woven fabrics quickly and easily. Under actual field conditions in dyeing and finishing plants, it has evidenced better rinsability than any other type of starch product.

Due to its smooth film-forming properties, NU-FILM produces grey fabrics with better 'closed-in' appearance and 'hand.' It's prepared in a matter of minutes, as this typical formula indicates:

85 lbs. NU-FILM
2 lbs. Mill Wax

Bulk to 100 Gallons

Raise temperature to a boil and hold for 20-30 minutes. Apply in the usual manner.

Sizing Filament Viscose yarns? Here again, NU-FILM excels as a replacement for gelatin.

NU-FILM laboratory samples will be sent without charge. A trial run supply will be shipped at quantity rate. NATIONAL STARCH PRODUCTS, 270 Madison Avenue, New York 16, N. Y.

• CLASSIFIED ADVERTISEMENTS •

EMPLOYMENT SERVICE—Over 50 Years in Business. EXECUTIVES seeking new positions are invited to file their confidential applications with us and keep informed of opportunities in textile mills.
EMPLOYERS with vacancies to fill or replacements to make will save valuable time by phoning, wiring or writing us their personnel requirements.

CHARLES P. RAYMOND SERVICE, Inc.
Phone LIberty 2-6547
294 Washington St., Boston 8, Mass.
SPECIALISTS IN PLACING
TEXTILE MILL EXECUTIVES

POSITION WANTED: Experienced Dyer and Technician Chemist by education, knowledge of all synthetic qualities. Five years practical application to production and quality. Married, draft exempt. Write Box No. 984.

SALES REPRESENTATIVE AVAILABLE: Formerly with prominent dyestuff manufacturer in charge of foreign sales, over 20 years experience. Would consider position with progressive concern. Write Box No. 985.

POSITION WANTED: Textile school graduate, five years experience dyeing and finishing cotton and synthetic piece goods and yarns. Also with textile chemical co. Write Box No. 986.

POSITION WANTED: Assistant Dyer, experienced dyeing, color matching and finishing. Textile College Degree plus B.Sc. Chemistry.. Married. Write Box No. 988.

CHEMIST WANTED—By textile chemical specialty concern. College degree with at least 4-5 years' experience in development and control of detergents, softeners, etc. An excellent opportunity for a man who has ambition, ability and desire to advance. Reply with resume of training and experience. Box No. 993.

POSITION WANTED—Pile fabric dyer with 23 years experience. Familiar with all types of fibers, cotton, rayon, mohair and wool. Write Box No. 996.

POSITION WANTED—DYESTUFFS MANUFACTURERS—Outstanding personality, exceptional technical and commercial knowledge and life-experience British, Swiss, German, French dyestuffs, their equivalents and applications, auxiliaries, chemicals, intermediates. Successful director, organizer. Three languages; export, buying, selling, international traveling, invites offers export manager, or branch manager Great Britain, Europe, Empire. Write Box No. 997.

POSITION WANTED—Production dyer-expert with synthetics and blends, desires change. Write Box No. 102.

SITUATION WANTED: HEAD DYER OR ASSISTANT DYER. Over 12 years experience bleaching, dyeing, finishing cotton, rayon goods and woolen mixtures in Scandinavia. Five years as technical representative for dyestuffs and textile auxiliaries. Age 35, married; references. Languages, English and German. Write Box No. 998.

POSITION WANTED—SALESMAN, graduate chemist. Ten years experience in development and sales of industrial chemicals. Particularly excellent background in textile specialties and surface active agents field. Seeking position with a future in a progressive, reputable firm. Write Box No. 999.

DYER WANTED—2nd shift Dyer wanted by New England Mill. Flat or knit goods experience in dyeing synthetic and natural fibers essential. Textile school training preferred. Please write details regarding background and work experience to Box No. 103.

POSITION WANTED: 34 years old. Textile school background. Over two years practical mill experience, backed by two and one-half years textile research, including dyeing and finishing on all types yarns and fibers. Desires position as dyestuff or chemical representative. No restrictions on location. Write Box No. 101.

POSITION WANTED—COLORIST-CHEMIST, experienced in printing on all fabrics. Capable to assume full reponsibility in running your screen printing plant. Considers any location in the U. S. A., or South America. Write Box No. 104.

Well established Eastern Dyestuff and Chemical Manufacturer has opening for a live wire salesman in the Southern territory. Reply Box No. 105.

REPORTER
CLASSIFIEDS
BRING
RESULTS!

Leatex

The name that means leadership in

CHEMICAL SPECIALTIES

for the TEXTILE INDUSTRY

"Always Reliable"

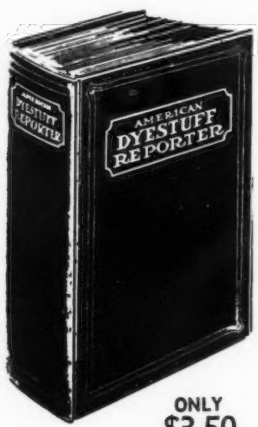
LEATEX CHEMICAL COMPANY
2722 N. HANCOCK ST., PHILADELPHIA 33, PA.

SPOTS DISAPPEAR BEFORE YOUR EYES

Superclean*
AMERICA'S BEST DETERGENT
* Trade Mark

A product of
Charles W. Berg Laboratories
Philadelphia 22, Pa.

Have you ordered this handsome Binder



ONLY $3.50 POSTPAID

for your American
DYESTUFF REPORTER

Every issue snapped into place in this beautiful maroon leatherette binder with the title AMERICAN DYESTUFF REPORTER in genuine gold leaf as shown. It is large enough to hold 26 issues. It looks and handles like the finest book in your library. The best we could find for the permanent preservation of your copies of the AMERICAN DYESTUFF REPORTER.

It opens flat for easy reference.

Please send check with order to:

AMERICAN DYESTUFF REPORTER
44 EAST 23rd STREET
NEW YORK 10, N. Y.

LOGWOOD

Natural Dyewoods Preserve Tensile Strength of

NYLON
FIBRES

Ask us for Dyeing Formula

•

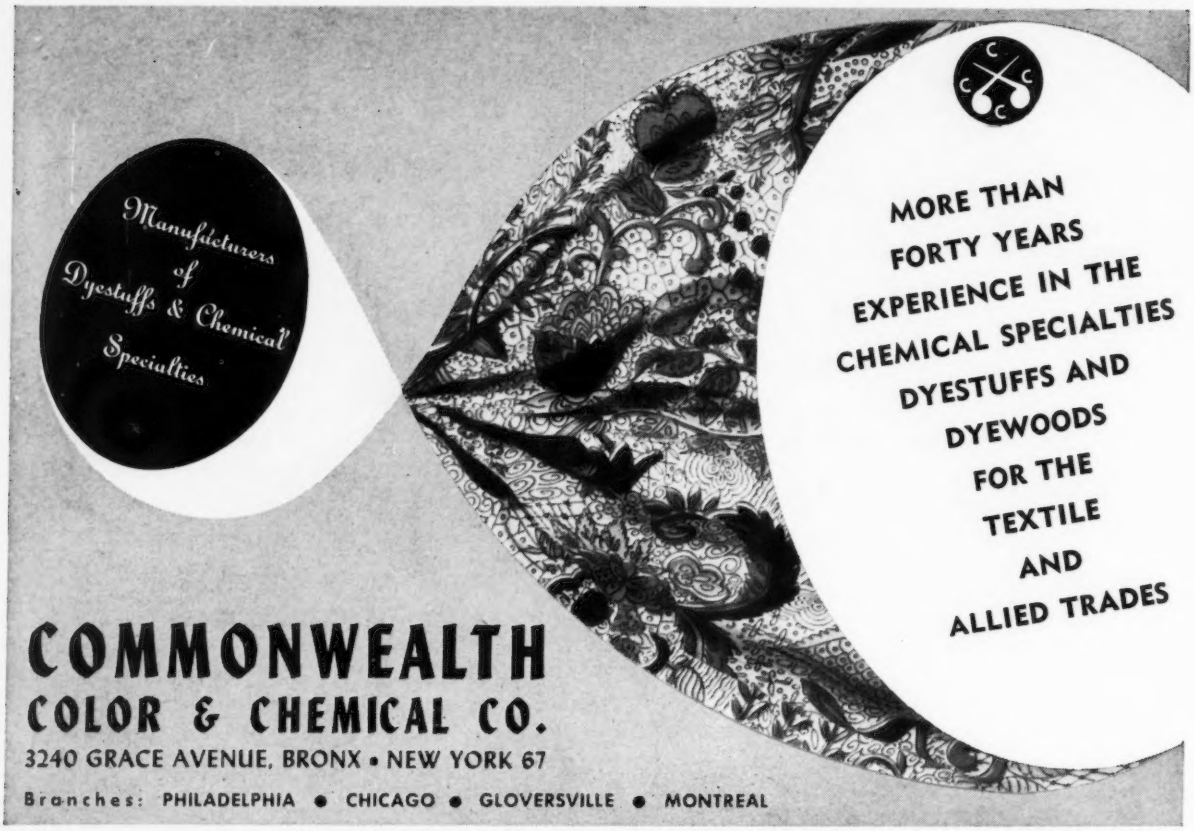
AMERICAN DYEWOOD CO.
285 MADISON AVE. NEW YORK 17

Color Division:
NEW YORK COLOR & CHEMICAL CO.
BELLEVILLE, N. J.

Branches:
BOSTON PHILADELPHIA CHICAGO

Canadian Representatives:
CANADA COLORS & CHEMICALS, LTD.
TORONTO and MONTREAL

Our 153rd Year


Manufacturers of Dyestuffs & Chemical Specialties
MORE THAN FORTY YEARS EXPERIENCE IN THE CHEMICAL SPECIALTIES DYESTUFFS AND DYEWOODS FOR THE TEXTILE AND ALLIED TRADES
COMMONWEALTH
COLOR & CHEMICAL CO.
3240 GRACE AVENUE, BRONX • NEW YORK 67
Branches: PHILADELPHIA • CHICAGO • GLOVERSVILLE • MONTREAL

Kali SPECIALIZED TEXTILE CHEMICALS

MEET SPECIFIC NEEDS OF PROCESSING

Much of the manufacturing capacity of the extensive Kali plant is devoted to the production of specialized chemicals, formulas for which have been worked out by Kali laboratory technicians to meet the problems of textile mills. Among these efficient chemicals are:

- NYLON SIZE — NYLON CONING OILS.
- KALPINOL used in troughs for knitting NYLON.
- HYDROXY* SIZES for Acetate, Viscose, Bemberg, Filament Yarns. Also for cut staple and mixtures.
- RAYSPINOLS for oiling cut staple stock. Cuts down waste and makes good spinning.
- HYDROXCENE for Rayon Crepe Yarns.
- WETTING and FINISHING AGENTS for Rayon, Nylon, Cotton, Silk, Cut Staples and Mercerized Cotton.
- PURE SILK THROWING OILS.
- WATERSHIELD Water Repellents.

*(Reg. U.S. Pat. Off.)

KALI MANUFACTURING COMPANY
Manufacturing Chemists
427 Moyer Street Philadelphia 25, Pa.

GRAPHITED NYLON LACE

THE SUPREME ALBINOL SOAP
Reg. U. S. Pat. Off.

YOU Probably have tried almost every scouring agent for cleaning except the original and very first real efficient scour on the market . . .

Evenol TEXTILE OIL
Reg. U. S. Pat. Off.

EVENOL "NYS"

made by the pioneers in this field of perfect scouring of Nylon laces.

TRY IT! SAVE TIME, have satisfactory results.

Use a product that has been proven highly efficient for years.

•

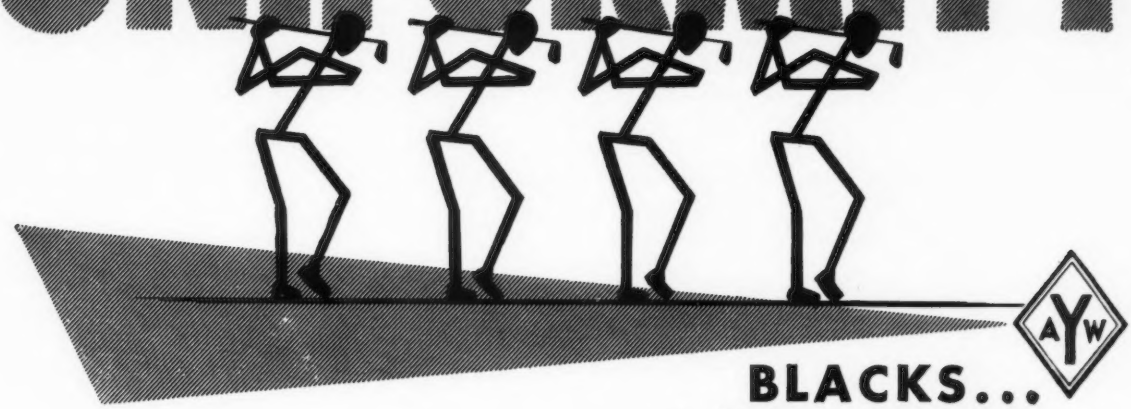
EUGENE VELLNER

Dyestuffs • Chemical Specialties

1209-11-13 N. FOURTH STREET
Philadelphia 22, Pa. STevenson 4-8512

• *Established 1917* •

UNIFORMITY



BLACKS...

• ACID • DIRECT •

• ACETATE • FORMALDEHYDE •

Consult your local dyestuff distributors for information and samples. Shipments can be made from their convenient stocks or from our Baltimore and Paterson warehouses.

YOUNG ANILINE WORKS, INC.

Office and Factory
2731 Boston Street, Baltimore 24, Md.

Paterson Office
50 East 13th Street, Paterson, N. J.

---

products for...

KIER BOILING
BOILING OFF
SCOURING
SIZING
DESIZING
BLEACHING
DYEING
SOFTENING
FINISHING

Inquiries Solicited

UNITED CHEMICAL PRODUCTS CORP.

Main Office and Plant:
YORK AND COLGATE STREETS • JERSEY CITY 2, N. J.

Branches:
Southern Division P. O. Box 1237 New Orleans 10, Louisiana
Western Agents: CHEMICAL PRODUCTS CORP., AURORA, ILL.

IT'S WHAT IS IN THE DRUM THAT MAKES THE DIFFERENCE

THERE IS A **REASON WHY**
the RICHMOND SYSTEM
of
SCOURING, DYEING & FINISHING
of
NYLON HOSIERY

WITH RELATED PRODUCTS GET BETTER RESULTS AT LOWER COSTS

See us at the Knitting Arts Exhibition, Booth No. 118

SEND FOR COMPLETE DETAILS

•

So. Office 617
Johnston Bldg.
Charlotte, N. C.

RICHMOND OIL, SOAP AND CHEMICAL COMPANY INC.

1041-43 FRANKFORD AVE. PHILADELPHIA 25, PA.

Export Agents
HOWARD G. GODFREY AND CO., INC.
456 Fourth Ave.
N. Y. 16, N. Y.

•

Cable Address
Godfreyarn

Suit by Swansdown

To the textile chemist Milady owes much of her pleasure in the marvelously dyed and finished fabrics of today. At Burkart-Schier our laboratory and staff is ever ready to give its capable aid in solving the many problems posed by the modern wet-processing of textiles.

BURKART-SCHIER CHEMICAL CO.

BURK SCHIER CHATTANOOGA, TENNESSEE BURK SCHIER

PENETRANTS • SOFTENERS • SOLUBLE OILS • FINISHES

INDEX TO ADVERTISERS

Alco Oil & Chemical Corp.	XXXIV
Althouse Chemical Co., Inc.	XXXII
Amalgamated Chemical Co.	XXVI
American Aniline Products, Inc.	V
American Cyanamid Co. (Ind. Chem. Div.)	
American Dyewood Co.	XXXIX
American Polymer Corporation	
Antara Products Division of General Dyestuff Corp.	
Apex Chemical Co., Inc.	
Arkansas Company, Inc.	IX
Armour and Co.	
Arnold, Hoffman & Co., Inc.	XXVII
Atlantic Chemical Co., Inc.	
Atlantic Chemical Corporation	
Atlantic Refining Co.	
Atlas Electric Devices Co.	XLIV
Barium Reduction Corp.	XXXIV
Becco Sales Corp.	XIII
Berg Laboratories, Charles W.	XXXIX
Bersworth Chemical Co.	
Bick & Co., Inc.	XXXVI
Blickman, Inc., S.	
Burkart-Schier Chemical Co.	XLII
Butterworth & Sons Co., H. W.	
Calco Chemical Division, American Cyanamid Co.	
Calgon, Inc.	
Campbell & Co., Inc., John	XVIII
Carbic Color & Chemical Co., Inc.	XXX
Carbide and Carbon Chemicals Div., Union Carbide and Carbon Corp.	
Catalin Corp. of America	XI
Ciba Company, Inc.	III
Colgate-Palmolive-Peet Company	
Commonwealth Color & Chemical Co.	XL
Crucible Steel Co. of America	
Drew & Co., Inc., E. F.	
Du Pont de Nemours & Co., E. I.	
Dyestuffs Division	
Electrochemicals Dept.	XXV
Emery Industries, Inc.	
Fancourt & Co., W. F.	XXIII
Gaston County Dyeing Machine Co.	IV
Geigy Company, Inc.	Front Cover
General Chemical Div., Allied Chemical & Dye Corp.	XLIII
General Dyestuff Corp.	XV
General Electric Co.	
Grinnell Co., Inc.	
Gross & Co., A.	XXVIII
Gurley, W. & L. E.	
Hart Products Corp.	
Hercules Powder Co.	
Heyden Chemical Corp.	
Hooker Electrochemical Co.	
Houghton & Co., E. F.	
Interchemical Corp., Textile Colors Div.	
International Salt Co., Inc.	
Kali Mfg. Co.	XL
Kelco Co.	XXXV
Laurel Soap Mfg. Co., Inc.	
Leatex Chemical Co.	XXXIX

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

Mixed Acid . . . Another of General Chemical's Great Products Serving "Behind the Scenes" in Your Daily Life

From the manufacture of high explosives . . .

to dyestuffs for Milady's finery

IN NITRATIONS

GENERAL CHEMICAL

MIXED ACID

Serves the Nation's Needs!

WHEREVER INDUSTRY USES NITRATIONS, you will find General Chemical Mixed Acid. That's because purchasing and operating executives everywhere are familiar with General's ability to provide it in the many mixtures of nitric and sulfuric acids their processes require.

AS A PRIMARY SUPPLIER, General Chemical has established coast-to-coast producing and distributing facilities for Mixed Acid in any quantity, from drum to tank car lots. That's important when manufacturing schedules are tight . . . or storage is limited. So for your needs, specify General Chemical Mixed Acid!

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

Offices in Principal Cities from Coast to Coast

Atlas Launder-Ometers

used in testing of Detergents at Wyandotte Chemicals Corporation

ATLAS Launder-Ometers, used to determine properties of detergency, color fastness, and resistance to washing and mechanical action, accurately reproduce washing conditions at accelerated speeds.

A typical application of the Launder-Ometer is a series of exhaustive tests conducted by theU. S. Army Quartermaster Corps and the Wyandotte Chemicals Corp. to determine the degree of sterilization and fading caused by various laundering and sterilization treatments of two selected types of Army fabrics—a cotton knit, and a 50% wool, 50% cotton knit. In these tests, the fabric samples were washed in a number of solutions containing chlorine-liberating germicidal agents, while mechanical action was simulated by 15 stainless steel balls introduced into each jar.

Results of these tests enabled the Quartermaster Corps to develop sterilization procedures for Army Mobile Laundry Units, and to obtain a fabric capable of withstanding rugged washing. In this, as in many other ways, testing in Atlas Launder-Ometers resulted in substantial savings and better materials.

New research model Launder-Ometers for accelerated testing of larger samples have recently been developed by Atlas. These units, with capacities ranging from 20 pint jars to 6 half-gallon containers, are now part of the complete line of standard Launder-Ometers.

ATLAS ELECTRIC DEVICES CO.

361 W. SUPERIOR ST., CHICAGO 10, ILLINOIS

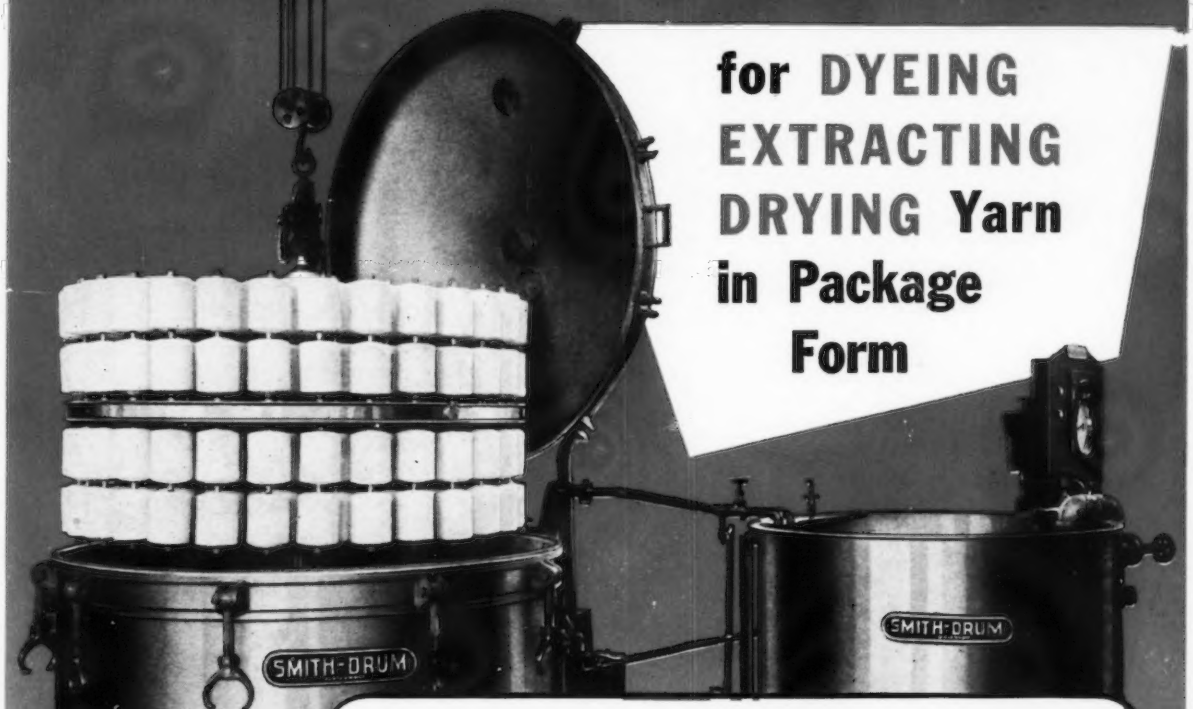
Originators and sole manufacturers of

FADE-OMETERS • WEATHER-OMETERS • LAUNDER-OMETERS

INDEX TO ADVERTISERS

Mathieson Chemical Corp.	
May, Inc., Otto B.	
Maywood Chemical Works	XVI
Metalsmith Div., Orange Roller Bearing Co., Inc.	XXXVI
Minneapolis-Honeywell Regulator Co. (Industrial Div.)	
Monsanto Chemical Co.	X
National Aniline Division, Allied Chemical & Dye Corp.	XXIX
National Milling & Chemical Co.	
National Starch Products	XXXVII
Naugatuck Chemical Div. of U. S. Rubber Co.	
Nopco Chemical Co.	
Nyanza Color & Chemical Co., Inc.	XX
Onyx Oil & Chemical Co.	XIX
Perkins & Son, Inc., B. F.	
Pfister Chemical Works, Inc.	Second Cover
Pfizer & Co., Inc., Chas.	
Procter & Gamble	VI
Prufcoat Laboratories, Inc.	XXXVI
Refined Products Corp.	XXI
Richmond Oil Soap & Chemical Co., Inc.	XLI
Rohm & Haas Company	XLVI
Royce Chemical Co.	Back Cover
Rumford Chemical Works	
Sandoz Chemical Works, Inc.	XXXIII
Scholler Bros., Inc.	Third Cover
Smith, Drum & Company	XLV
Socony-Vacuum Oil Co., Inc.	
Solvay Sales Div., Allied Chemical & Dye Corp.	VII
Standard Brands, Inc.	
Standard Chemical Products, Inc.	
Standard Fabricators, Inc.	
Stein, Hall & Co.	XIV
Synthron, Inc.	
Tennessee Corporation	
Tennessee Eastman Co.	XVII
Tex-Chem Co.	
Trent Tube Co.	
Union Carbide and Carbon Corp., Carbide and Carbon Chemicals Div.	
United Chemical Products Corp.	XLI
U. S. Rubber Co., Naugatuck Chemical Div.	
Vanderbilt Co., Inc., R. T.	
Van Vlaanderen Machine Co.	XXII
Vellner, Eugene	XL
Virginia Smelting Co.	
Wallerstein Co., Inc.	XII
Warwick Chemical Co.	XXIV
Watson-Park Co.	
Winthrop-Stearns Inc.	
Wolf & Co., Jacques	
Wyandotte Chemicals Corp.	VIII
Young Aniline Works, Inc.	XLI
Young Co., J. S.	
Zinsser & Co., Inc.	

There's a SMITH–DRUM System to Meet Every Operating Problem...



for DYEING EXTRACTING DRYING Yarn in Package Form

Faster, Better, at Lower Cost

Your requirements for package dyeing, extracting and drying are determined by your location, the capacity you wish to establish, the type of colors (direct, vats, developed, naphthol, acid, etc.) you are going to use, the cost of water, steam and electric power.

That is why you should consult Smith-Drum regarding your plans. Qualified engineers, each with a background of textile training and practical experience, will show you what advantages you can obtain from using the proper selection of Smith-Drum package dyeing, extracting and drying machines to meet your own requirements.

The proper selection of "The Best Machine" of each type will insure your getting the best results, in the shortest time at the lowest cost.

Write for Catalog No. PBD-801 and have our engineer call.

TWO INTEGRATED SYSTEMS

① Package Dyeing Machine (illustrated)
Mechanical Extracting Machine
Cabinet Type Drying Machine

★

② Package Dyeing Machine (illustrated)
Pressure Extracting Machine
Port Type Drying Machine

★

SMITH, DRUM & COMPANY

ALLEGHENY AVENUE AT 5th STREET, PHILADELPHIA 33, PA.

SURE AS HOOTING...

TRITON X-100

speeds your processing from gray to finish

Makes water wetter —so it penetrates better

TRITON X-100 is a concentrated 100% active penetrant and detergent, non-ionic, and alkali-and-acid stable. As a scouring agent for wool, cotton and synthetic fibres, it is a fast wetter, an excellent detergent and an outstanding emulsifier for oil and grease. And in dyeing and finishing too, it speeds processing and cuts costs. Be wise and thrifty. Send for full details of TRITON X-100 today.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

TRITON is a trade-mark, Reg. U. S. Pat. Off. and in principal foreign countries.

Because DURA BEAU *finishes give stockings that smoky-dull beauty—increased resistance to snags, runs and spots—* DURA BEAU*-finished stockings out-sell all other stockings combined! It's the eye-appeal that makes sales-appeal!*

Posed Exclusively for DURA BEAU
GLORIA DE HAVEN
Starring in
"Two Tickets To Broadway"
An RKO Picture

DuraBeau
Reg. U.S.A. and Canada
TEXTILE FINISHES

SCHOLLER BROS., INC. • Manufacturers of Soaps, Softeners, Sulphonated Oils and Finishes • Collins & Westmoreland Sts., Phila. 34, Pa. • St. Catharines, Ont., Can.

DO NOT CIRCULATE
GREENVILLE PUBLIC LIBRARY

A junior dress by Betty Barclay in a vat dyed cotton broadcloth.

vatrolite®

concentrated sodium hydrosulphite

A powerful agent for vat dyeing and color reduction by any of the modern continuous methods or in apparatus dyeing.

Royce

CHEMICAL COMPANY · CARLTON HILL, NEW JERSEY

Manufacturers of Chemicals for the Textile Industry

ROYCE CHEMICAL CO.

6744